

Exhibit 12 Part 20

Attachments M-S to Allocation Recommendation Report (ARR2873-ARR3249)

United States' Motion to Enter Consent Decree,
United States v. Alden Leeds, Inc. et al., Civil Action No. 22-7326 (D.N.J.)

ATTACHMENT M

HISTORY OF SEWER COLLECTION AND TREATMENT IN THE PASSAIC VALLEY

Diamond Alkali Superfund Site OU2 Allocation Recommendation Report

ADR Confidential**HISTORY OF SEWER COLLECTION AND TREATMENT IN THE PASSAIC VALLEY**

One of the primary pathways for the release of COCs to the Passaic River and OU2 was via connection with the local sewer systems that collected wastes from residential and industrial properties in the Passaic River Valley – the Passaic Valley Sewer Commission (PVSC) and its predecessor sewer collection systems. The great majority of Allocation Parties discharged COCs to the Passaic River via sanitary or stormwater sewer connections.

Encompassing approximately 155 square miles, including 48 municipalities in parts of Bergen, Essex, Hudson, Passaic and Union Counties, the PVSC services approximately 1.4 million residents, more than 5,000 commercial entities and 200 significant users (FEMA - *Environmental Assessment Passaic Valley Sewerage Authority Floodwall and On-Site Power System Construction Newark, Essex County, New Jersey, 4086-DR-NJ PW4701, June 2015*). The PVSC owns, operates and maintains a 22-mile long Main Intercepting Sewer that traverses Paterson, Clifton, Passaic, Nutley, Belleville, and Newark along its route to the Wastewater Treatment Plant, or Publicly Owned Treatment Works (POTW) in Newark, which is located along Wilson and Doremus Avenues adjacent to Newark Bay. Along this Main Intercepting Sewer, or “Trunk Line”, there are 11 Branch Interceptor Sewers (18 total miles), as well as several Lateral and Local Sewer Connections (approximately 2,000 total miles) that receive flow from local municipalities’ collection systems. In serving the wastewater needs of its residents, businesses, and industries, the PVSC sewer system processes approximately 330 million gallons per day, about a quarter of all the waste generated in all of New Jersey.

The PVSC is one of the oldest and largest regional sewerage commissions in the country, established in 1902, but sewer construction and operation in this part of the country goes back even further. As early as 1854, Newark’s first sewer was completed, carrying waste under Broad Street running east under Park Place and Rector Street before emptying into the Passaic River (PAP-00701819). Even though hundreds of miles of sewer and interceptor lines were in place by the turn of the century, accommodating almost all of Newark’s homes and business, all waste still flowed into the Passaic River, untreated (PAP-00701823).

Diverting waste away from the immediate vicinity of a residence or business to the river on the other side of town solved one problem, but it created another—a polluted Passaic River. In 1895, the boards of health of the lower Passaic River Valley described the condition of the river as causing “nauseating odors, increased sickness, and economic losses” (PAP-00701823). In the late 1890s, a state investigatory commission, organized to study different sewage disposal options, recommended that a trunk sewer be built along the Passaic River to intercept and carry sewage into Newark Bay. To oversee the ambitious engineering endeavor, the PVSC was established in 1902 and construction of the new Trunk Line began in 1912. By 1924, the Trunk Line was finally complete, linking 22 municipalities along the Passaic River draining 80 square miles from Patterson to Newark Bay, where raw sewage was treated at a pumping station before plunging into the Newark shaft to an outfall in Newark Bay and eventual diffusion into New York Bay. The 280-foot concrete-lined shaft was the nation’s first deep shaft outfall pressure tunnel (PAP-00701823).

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Diamond Alkali Superfund Site OU2 Allocation Recommendation Report

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Given the sheer size, scope, complexity, and engineering challenges of the PVSC Sewer System, its infrastructure and operation has undergone many changes and modifications over the past century, as one would expect. Lines have been added and replaced, treatment systems have been upgraded and expanded, and much more all in the effort to accommodate the volume of wastewater and stormwater while minimizing pollution, within the limitations of physics and engineering. One such addition came in the form of Combined Sewer Overflows, or CSOs. To accommodate larger waste volumes during wet weather overflow events, CSOs were constructed at various locations along the Interceptor Sewer lines, mostly the Trunk Line, but along the Branch Interceptors as well. During dry weather events, the sewer lines (Sanitary, Stormwater, and Combined) eventually all lead to their respective Interceptor sewers, which then carries contained sewerage to the POTW to be treated.

However, in wet weather events, water volume in the PVSC collection system can exceed the POTW's capacity to effectively process and treat it. In such events, the excess wastewater and stormwater is diverted via regulator chambers and then released via bypass valve directly to the Passaic River, via CSOs. The regulator chambers are usually located where sewage districts, or Collection Areas, join the trunk sewer line (PAP-00342195). Collection Areas are sections of the municipalities that are defined by their shared flow to one particular CSO. For example, the Verona Avenue Collection Area on the west side of the Passaic River (river mile 8) covers an area of over 387 acres in northwest Newark. In dry weather events, all discharge from this area makes its way to the Trunk Line (at river mile 8), with eventual flow to the POTW at Newark Bay. But in wet weather events, when the water volumes exceed the capacity of the POTW, the Verona Avenue Bypass may be employed to divert excess wastewater and stormwater into the Passaic River, untreated.

This same operation applies to all of the Collection Areas and CSOs in the PVSC sewer system. In addition to the official CSO Collection areas, there is also the Yantacaw Bypass and the Union River Outlet collection systems. In wet weather events, if the POTW at Newark Bay has exceeded its capacity to handle the water volume, any wastewater and stormwater contents of the Trunk Line north of Yantacaw Bypass (River Mile 11) in Clifton gets released into the Passaic River at the Yantacaw Bypass. Similarly in wet weather events, if the POTW at Newark Bay has exceeded its capacity to handle the water volume, the municipalities of Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange and Little Falls that have sewer discharge below Yantacaw Bypass and above Union Outlet (river mile 8) have their combined wastewater and stormwater released into the Passaic River via bypass at the Union River Outlet.

The PVSC system is large and complex and can look very different at any given time and place. In general, the PVSC Sewer System operates with the Interceptor Sewers (Main and Branch) carrying discharge to the POTW for treatment, except in wet weather events when the POTW is beyond its capacity to process the water volume received. In those cases, the CSOs and Bypasses are employed to divert the untreated discharge from their respective Collection Areas into the Passaic River. Attachment M provides maps indicating the general layout of the PVSC collection system, the location of Allocation Party facilities, and the location of primary CSOs and Bypasses.

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ATTACHMENT N
CSO VALVE WORKSHEETS

ARR2876

ADR CONFIDENTIAL - NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

NPDES	CSO Municipality	CSO Name	CSO Percentage Overflow Time	Percentage CSO Flow in Overflow	CSO Overflow Time Percentage x CSO Volume	CSO Observation Start Date	CSO Observation End Date	Comments
015/H-006	Harrison	Bergen Street	0.33%	64.09%	0.211%	7/6/1975	9/12/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
008/E-001	East Newark	Central Avenue	0.37%	61.94%	0.231%	4/24/1975	6/6/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
038/N-011	Newark	City Dock	0.11%	61.80%	0.068%	1/1/1975	7/20/1975	High tides cause tide gates to remain closed on some days, preventing overflow to river.
033/N-006	Newark	Clay Street	0.90%	41.36%	0.373%	9/13/1974	9/21/1975	No overflows observed by Killam during short observation period. Killam notes that height of brick dam at CSO inhibits overflow.
029/N-002	Newark	Delavan Avenue	0.00%	NA	NA	7/12/1975	9/27/1975	
023/K-007	Kearny	Ivy Street	1.83%	66.23%	1.212%	1/1/1975	6/16/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river.
022/K-006	Kearny	Johnston Avenue	0.78%	80.50%	0.631%	1/1/1975	6/16/1975	
014/H-005	Harrison	Middlesex Street	0.51%	46.17%	0.238%	4/24/1975	7/6/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
020/K-004	Kearny	Nairn Avenue	0.22%	19.85%	0.044%	6/5/1975	8/7/1975	Short observation period.
040/N-013	Newark	Polk Street	0.10%	69.05%	0.068%	2/23/1975	8/7/1975	High tides cause tide gates to remain closed on some days, preventing overflow to river.
016/H-007	Harrison	Worthington Avenue	NA	NA	NA	5/12/1975	5/21/1975	No metering done at this
004	Clifton	Yantacaw Pump	NA	NA	NA			Inactive -- no metering performed.
003	Clifton	Yantacaw Street	NA	NA	NA			Inactive -- no metering performed.

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CSO Municipality	CSO Name	Area Covered		Source	
Harrison	Bergen Street	0.113	72	LPRSA0196705	PAP-00211877
East Newark	Central Avenue	0.041	26	LPRSA0196785	PAP-00211900
Newark	City Dock	0.594	380	LPRSA0196837	PAP-00211916
Newark	Clay Street	2.538	1,621	LPRSA0196890	PAP-00211931
Newark	Delavan Avenue	0.137	88	LPRSA0196952	PAP-00211953
Newark	Fourth Avenue	0.352	225	LPRSA0197116	PAP-00211995
Kearny	Ivy Street	0.949	607	LPRSA0196062	PAP-00211299
Kearny	Johnston Avenue	0.323	207	LPRSA0196129	PAP-00211367
Harrison	Middlesex Street	0.097	62	LPRSA0196229	PAP-00211468
Kearny	Nairn Avenue	0.275	176	LPRSA0196252	PAP-00211534
Newark	Polk Street	0.311	199	LPRSA0196539	PAP-00211773
Newark	Verona Avenue	0.573	367	LPRSA0195826	PAP-00212451
Wallington	Wallington Pump Station	3.944	2,524	LPRSA0195850	PAS-00120922
Rutherford	Woodward Avenue	0.322	206	LPRSA0195894	PAS-00120922
Harrison	Worthington Avenue	0.277	177	LPRSA0195919	PAS-00212274
Clifton	Yantacaw Pump Station	2.123	1,359	LPRSA0195942	PAS-00120922
Clifton	Yantacaw Street	7.969	5,100	LPRSA0195963	PAS-00120922

Bergen Street (Harrison) CSO Overflows
Harrison

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CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers	Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)	Dry Weather Volume (MG)	Total Volume (in system + overflow) (MG)
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(7/6/1975-9/12/1975)

7/9/75	7/9/75	1.28	LPRSA0196199	10.1	0.5	0.54	0.04	0.77
7/13/75	7/13/75	0.83	LPRSA0196199	4.2	0.1	0.15	0.03	0.30
7/20/75	7/21/75	1.67	LPRSA0196199	7.5	0.5	0.52	0.06	0.83
8/6/75	8/7/75	0.88	LPRSA0196199	7.0	0.3	0.26	0.03	0.42
9/12/75	9/12/75	0.70	LPRSA0196199	10.0	0.3	0.29	0.02	0.42
Total		5.36				1.75	0.19	2.74
Average dry weather flow (MGD):			LPRSA0196196	0.83				
Combined flow to produce an overflow (MGD):			LPRSA0196196	4.40				

Total Observation Period:

7/6/1975	9/12/1975	1632.00	LPRSA0196199	LPRSA0196199
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Overflow percentage of total time= 0.33%
Percentage CSO Overflow/Total Flow = 64.09%

Note: At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river.

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Kearny/Harrison/East Newark Area, prepared for PVSC, 1976.

PAP-00211435
PAP-00211438

Central Avenue (East Newark) CSO Overflows
East Newark

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CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers	Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)	Dry Weather Volume (MG)	Total Volume (in system + overflow) (MG)
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(4/24/1975-6/6/1975)

5/2/75	5/2/75	0.28	LPRSA0195992	1.3	Negligible	0.02	0.00	0.08
5/6/75	5/6/75	0.32	LPRSA0195992	6.1	0.1	0.08	0.00	0.16
5/16/75	5/16/75	1.50	LPRSA0195992	3.3	0.2	0.21	0.01	0.56
6/1/75	6/1/75	1.75	LPRSA0195992	15.9	1.2	1.16	0.01	1.57
Total		3.85				1.46	0.02	2.36
Average dry weather flow (MGD):			LPRSA0195989	0.14				
Combined flow to produce an overflow (MGD):			LPRSA0195989	5.60				

Total Observation Period:			
4/24/1975	6/6/1975	1032.00	LPRSA0195992 LPRSA0195992

Overflow percentage of total time= 0.37%
Percentage CSO Overflow/Total Flow = 61.94%

Note: At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river.

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Kearny/Harrison/East Newark Area, prepared for PVSC, 1976.

PAP-00211243
PAP-00211246

City Dock (Newark) CSO Overflows
Newark

ADR CONFIDENTIAL - NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers	Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)	Dry Weather Volume (MG)	Total Volume (in system + overflow) (MG)
(1/1/1975-7/20/1975)								
3/12/75	3/12/75	0.50	LPRSA0197075	36.9	0.8	0.8	0.20	1.24
3/30/75	3/30/75	1.25	LPRSA0197075	4.8	0.3	0.3	0.51	1.43
5/12/75	5/13/75	1.83	LPRSA0197075	23.3	1.8	1.8	0.75	3.51
5/16/75	5/16/75	1.00	LPRSA0197075	81.6	3.4	3.4	0.41	4.35
6/1/75	6/1/75	0.67	LPRSA0197075	65.9	1.8	1.8	0.27	2.47
Total		5.25				8.04	2.14	13.00

Note: High tides cause tide gates to remain closed on some days, preventing overflow to river.

Average dry weather flow (MGD):	LPRSA0197072	9.78
Combined flow to produce an overflow (MGD):	LPRSA0197072	22.70

Total Observation Period:				
1/1/1975	7/20/1975	4800.00	LPRSA0197075	LPRSA0197076

Overflow percentage of total time= 0.11%
Percentage CSO Overflow/Total Flow = 61.80%

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

PAP-00211977	
PAP-00211977	12-31-1974 to 7-21-1975
PAP-00211982	

Exhibit 1h. Documented PVSC Bypasses at City Dock
(Newark)

Allocation Report			
	Time of bypasses	Time observed	% of Total Time
1950-1962	8695:55:00	87155:30:00	9.98%
1974-1975	0:00:00	0:00:00	0:00:00%
Total	8695:55:00	87155:30:00	9.98%

Koch report 1950-1962 (PAP-PAP-00488452 - PAP-00488454)					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates Number (throw-out logs)	Comments
10/4/1950 22:00	10/5/1950 11:30	13:30:00	LPRSA0188654	PAP-00456399	
10/10/1950 2:30	10/10/1950 13:00	10:30:00	LPRSA0188652	PAP-00456397	
10/12/1950 13:30	10/13/1950 11:00	21:30:00	LPRSA0188650	PAP-00456395	
10/23/1950 13:30	10/24/1950 9:00	19:30:00	LPRSA0188648	PAP-00456393	
11/20/1950 18:00	11/21/1950 9:00	15:00:00	LPRSA0188646	PAP-00456391	
11/25/1950 9:00	11/25/1950 13:00	4:00:00	LPRSA0188643	PAP-00456388	
12/4/1950 12:30	12/5/1950 9:30	21:00:00	LPRSA0188641	PAP-00456386	
12/7/1950 16:00	12/8/1950 11:30	19:30:00	LPRSA0188637	PAP-00456382	
12/15/1950 22:30	12/16/1950 14:30	16:00:00	LPRSA0188639	PAP-00456384	
12/29/1950 12:30	12/30/1950 11:30	23:00:00	LPRSA0188635	PAP-00456380	
1/7/1951 17:00	1/8/1951 9:00	16:00:00	LPRSA0188633	PAP-00456378	
1/11/1951 17:30	1/12/1951 8:30	15:00:00	LPRSA0188619	PAP-00456364	
1/14/1951 18:00	1/15/1951 12:00	18:00:00	LPRSA0188631	PAP-00456376	
1/23/1951 2:00	1/24/1951 14:00	36:00:00	LPRSA0188621	PAP-00456366	
1/25/1951 16:00	1/26/1951 10:00	18:00:00	LPRSA0188623	PAP-00456368	
1/28/1951 17:00	1/30/1951 10:00	41:00:00	LPRSA0188625	PAP-00456370	
1/31/1951 16:00	2/2/1951 10:00	42:00:00	LPRSA0188628	PAP-00456373	
2/10/1951 5:30	2/10/1951 14:30	9:00:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/11/1951 18:00	2/15/1951 14:30	92:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/17/1951 4:00	2/18/1951 11:30	31:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/19/1951 17:00	2/20/1951 14:30	21:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
2/23/1951 8:30	2/23/1951 10:00	1:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
	2/25/1951 10:00		LPRSA0188596	PAP-00456064; PAP-00456341	
3/1/1951 13:00	3/2/1951 10:00	21:00:00	LPRSA0188604	PAP-00456349	
3/3/1951 15:00	3/5/1951 10:30	43:30:00	LPRSA0188606	PAP-00456351	
3/13/1951 16:30	3/15/1951 9:30	41:00:00	LPRSA0188609	PAP-00456354	
3/16/1951 16:00	3/19/1951 9:30	65:30:00	LPRSA0188612	PAP-00456357	
3/19/1951 17:00	3/21/1951 9:00	40:00:00	LPRSA0188616	PAP-00456361	

3/22/1951 0:00	12/31/1951 23:59				data missing
2/17/1952 3:30	2/19/1952 11:00	55:30:00	LPRSA0189755	PAP-00456150	
2/20/1952 18:00	2/22/1952 10:30	40:30:00	LPRSA0189754	PAP-00456149	
2/29/1952 21:00	3/7/1952 10:30	157:30:00	LPRSA0189753	PAP-00456148	
3/11/1952 5:00	3/18/1952 10:30	173:30:00	LPRSA0189752	PAP-00456147	
3/19/1952 10:30	3/21/1952 11:00	48:30:00	LPRSA0189751	PAP-00456146	
3/22/1952 17:00	3/26/1952 11:00	90:00:00	LPRSA0189750	PAP-00456145	
4/5/1952 8:00	4/7/1952 11:00	51:00:00	LPRSA0189749	PAP-00456144	
4/14/1952 4:00	4/17/1952 11:00	79:00:00	LPRSA0189748	PAP-00456143	
4/23/1952 16:30	4/24/1952 11:30	19:00:00	LPRSA0189747	PAP-00456142	
4/25/1952 11:00	5/9/1952 16:30	341:30:00	LPRSA0189744	PAP-00456139, 141	
5/11/1952 22:00	5/14/1952 14:30	64:30:00	LPRSA0189743	PAP-00456138	
5/18/1952 8:45	5/23/1952 15:30	126:45:00	LPRSA0189741	PAP-00456136	
5/25/1952 10:15	5/27/1952 13:30	51:15:00	LPRSA0189740	PAP-00456135	
5/29/1952 16:15	6/14/1952 10:30	378:15:00	LPRSA0189736	PAP-00456131	
6/17/1952 18:15	6/18/1952 14:30	20:15:00	LPRSA0189735	PAP-00456130	
6/19/1952 14:15	6/20/1952 9:00	18:45:00	LPRSA0189734	PAP-00456129	
6/27/1952 16:40	6/28/1952 9:30	16:50:00	LPRSA0189729	PAP-00456124	
6/29/1952 2:00	6/30/1952 10:50	32:50:00	LPRSA0189728	PAP-00456123	
7/8/1952 17:00	7/10/1952 16:15	47:15:00	LPRSA0189730	PAP-00456125	
7/21/1952 17:15	7/22/1952 13:30	20:15:00	LPRSA0189726	PAP-00456121	
7/31/1952 17:25	8/1/1952 10:25	17:00:00	LPRSA0189724	PAP-00456119	
8/2/1952 17:00	8/3/1952 10:15	17:15:00	LPRSA0189725	PAP-00456120	
8/6/1952 16:00	8/11/1952 10:00	114:00:00	LPRSA0189715	PAP-00456110, 113	
8/12/1952 18:00			LPRSA0189721	PAP-00456116	data missing
8/15/1952 17:45	8/17/1952 9:45	40:00:00	LPRSA0189714	PAP-00456109	
8/21/1952 17:15	8/22/1952 13:30	20:15:00	LPRSA0189713	PAP-00456108	
8/30/1952 10:45	9/2/1952 9:45	71:00:00	LPRSA0189712	PAP-00456107	
9/2/1952 17:45	9/4/1952 9:30	39:45:00	LPRSA0189711	PAP-00456106	
9/15/1952 17:15	9/17/1952 17:45	48:30:00	LPRSA0189709	PAP-00456104	
9/18/1952 13:45	9/20/1952 9:45	44:00:00	LPRSA0189710	PAP-00456105	
9/23/1952 11:15	9/24/1952 10:00	22:45:00	LPRSA0189708	PAP-00456103	
10/2/1952 19:45	10/3/1952 14:15	18:30:00	LPRSA0189707	PAP-00456102	
10/28/1952 18:15	10/29/1952 9:45	15:30:00	LPRSA0189706	PAP-00456101	
11/3/1952 14:45	11/4/1952 9:45	19:00:00	LPRSA0189703	PAP-00456098	
11/10/1952 17:15	11/11/1952 9:45	16:30:00	LPRSA0189704	PAP-00456099	
11/14/1952 14:15	12/1/1952 14:15	408:00:00	LPRSA0189701	PAP-00456096	
12/2/1952 14:45	12/8/1952 9:30	138:45:00	LPRSA0189702	PAP-00456097	
12/9/1952 8:45	1/18/1953 15:15	966:30:00	LPRSA0189655	PAP-00456556	
1/21/1953 15:45	1/22/1953 13:30	21:45:00	LPRSA0189656	PAP-00456557	
1/24/1953 10:45	1/25/1953 10:30	23:45:00	LPRSA0189657	PAP-00456558	
2/11/1953 18:00	2/13/1953 11:00	41:00:00	LPRSA0189658	PAP-00456559	
2/15/1953 11:45	2/16/1953 14:30	26:45:00	LPRSA0189659	PAP-00456560	
2/25/1953 9:45	3/11/1953 10:00	336:15:00	LPRSA0189661	PAP-00456562	
	3/14/1953 13:15		LPRSA0189670	PAP-00456161	data missing
3/17/1953 15:15	4/28/1953 13:30	1006:15:00	LPRSA0189670	PAP-00456161	
4/29/1953 9:30	4/29/1953 15:30	6:00:00	LPRSA0189670	PAP-00456161	

4/30/1953 17:45	5/8/1953 16:00	190:15:00	LPRSA0189670	PAP-00456161	
5/8/1953 11:30			LPRSA0189670	PAP-00456161	data missing
6/13/1953 18:00	6/15/1953 11:15	41:15:00	LPRSA0189674	PAP-00456563	
6/22/1953 11:00	7/2/1953 15:00	244:00:00	LPRSA0189677	PAP-00456566	
7/6/1953 21:00	7/7/1953 9:30	12:30:00	LPRSA0189681	PAP-00456570	
7/20/1953 22:00	7/21/1953 9:35	11:35:00	LPRSA0189682	PAP-00456571	
7/21/1953 16:45	7/22/1953 9:15	16:30:00	LPRSA0189683	PAP-00456572	
7/23/1953 9:25	7/24/1953 13:30	28:05:00	LPRSA0189684	PAP-00456573	
8/14/1953 14:15	8/15/1953 9:30	19:15:00	LPRSA0189686	PAP-00456575	
10/6/1953 19:30	10/7/1953 10:30	15:00:00	LPRSA0189689	PAP-00456578	
10/20/1953 9:15	10/29/1953 17:30	224:15:00	LPRSA0189690	PAP-00456579	
11/7/1953 8:15	11/8/1953 11:45	27:30:00	LPRSA0189695	PAP-00456584	
11/16/1953 10:45			LPRSA0189653	PAP-00456554	data missing
11/23/1953 11:00	11/23/1953 15:15	4:15:00	LPRSA0189698	PAP-00456587	
11/25/1953 13:15	11/26/1953 10:00	20:45:00	LPRSA0189652	PAP-00456553	
11/30/1953 11:00	12/5/1953 8:45	117:45:00	LPRSA0189651	PAP-00456552	
12/6/1953 10:30	12/8/1953 10:00	47:30:00	LPRSA0189650	PAP-00456551	
12/9/1953 17:30	12/11/1953 10:00	40:30:00	LPRSA0189649	PAP-00456550	
12/14/1953 7:15	12/15/1953 13:45	30:30:00	LPRSA0189647	PAP-00456548	
1/15/1954 14:00	1/18/1954 10:45	68:45:00	LPRSA0189592	PAP-00456493	
1/20/1954 15:00	1/22/1954 13:30	46:30:00	LPRSA0189591	PAP-00456492	
1/25/1954 4:00	2/2/1954 14:00	202:00:00	LPRSA0189590	PAP-00456491	
2/3/1954 14:30	2/4/1954 10:30	20:00:00	LPRSA0189589	PAP-00456490	
2/15/1954 15:00	2/19/1954 14:15	95:15:00	LPRSA0189587	PAP-00456488	
2/21/1954 18:15	2/22/1954 9:45	15:30:00	LPRSA0189586	PAP-00456487	
2/23/1954 13:00	2/27/1954 9:45	92:45:00	LPRSA0189621	PAP-00456522	
3/1/1954 12:00	3/5/1954 14:45	98:45:00	LPRSA0189619	PAP-00456520	
3/13/1954 16:00	3/15/1954 10:30	42:30:00	LPRSA0189618	PAP-00456519	
3/19/1954 17:30	3/20/1954 13:40	20:10:00	LPRSA0189617	PAP-00456518	
3/25/1954 11:00	3/26/1954 10:45	23:45:00	LPRSA0189616	PAP-00456517	
4/8/1954 14:45	4/9/1954 10:30	19:45:00	LPRSA0189613	PAP-00456514	
4/13/1954 13:30	4/13/1954 15:00	1:30:00	LPRSA0189623	PAP-00456524	
4/16/1954 13:50	4/18/1954 10:50	45:00:00	LPRSA0189632	PAP-00456533	
4/19/1954 16:45	4/21/1954 15:30	46:45:00	LPRSA0189615	PAP-00456516	
4/23/1954 14:30	4/25/1954 10:30	44:00:00	LPRSA0189614	PAP-00456515	
4/28/1954 16:15	4/29/1954 10:30	18:15:00	LPRSA0189612	PAP-00456513	
5/3/1954 11:45	5/26/1954 9:45	550:00:00	LPRSA0189631	PAP-00456532	
6/1/1954 12:45	6/3/1954 16:30	51:45:00	LPRSA0189630	PAP-00456531	
7/2/1954 10:00	7/2/1954 17:00	7:00:00	LPRSA0189626	PAP-00456527	
7/4/1954 13:15	7/4/1954 14:30	1:15:00	LPRSA0189625	PAP-00456526	
9/10/1954 14:45	9/12/1954 10:30	43:45:00	LPRSA0189606	PAP-00456507	
5/16/1957 0:00	8/25/1957 23:59				data missing
9/18/1957 0:00	12/19/1957 23:59				data missing
9/12/1960 12:20	9/13/1960 9:30	21:10:00	LPRSA0189397	PAP-00456240	
1/1/1963 0:00	12/31/1974 23:59				data missing
Subtotal 1950-1962 Koch Report		8676:55:00			

Subtotal 1950-1962 Throw out Logs		8695:55:00			
Koch report (1974-1975) PAP-00488455					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		
1/1/1975	1/1/1975	0:00:00	LPRSA0197075	PAP-00456754	
7/20/1975	7/20/1975	0:00:00	LPRSA0197076	PAP-00456755	
7/21/1975	12/31/2004				data missing
Subtotal 1974-1975 Koch Report		0:00:00			

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

Clay Street (Newark) CSO Overflows
Newark

ADR CONFIDENTIAL - NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers	Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)	Dry Weather Volume (MG)	Total Volume (in system + overflow) (MG)
(9/13/1974-9/21/1975)								
9/13/74	9/14/74	2.00	LPRSA0196840	26.7	2.2	2.2	2.27	8.31
1/1/75	1/1/75	1.97	LPRSA0196840	7.7	0.6	0.6	2.23	6.62
1/18/75	1/18/75	2.25	LPRSA0196840	82.2	7.7	7.7	2.55	14.55
1/19/75	1/20/75	4.25	LPRSA0196840	10.8	1.9	1.9	4.82	14.84
1/25/75	1/25/75	6.50	LPRSA0196840	18.1	4.9	4.9	7.37	24.67
1/29/75	1/29/75	2.00	LPRSA0196840	40.0	3.3	3.3	2.27	9.42
2/23/75	2/23/75	2.62	LPRSA0196840	58.0	6.3	6.3	2.97	14.30
2/24/75	2/24/75	3.75	LPRSA0196840	74.2	11.6	11.6	4.25	23.00
3/12/75	3/12/75	5.50	LPRSA0196840	46.1	10.6	10.6	6.23	27.29
3/30/75	3/30/75	3.25	LPRSA0196840	37.0	4.9	5.0	3.68	14.90
4/3/75	4/3/75	1.25	LPRSA0196840	106.7	5.6	5.6	1.42	9.36
4/24/75	4/25/75	9.00	LPRSA0196840	25.2	9.4	9.5	10.20	36.83
4/25/75	4/26/75	6.13	LPRSA0196840	13.9	3.6	3.6	6.95	22.20
5/2/75	5/2/75	1.50	LPRSA0196840	41.2	2.6	2.6	1.70	7.14
5/4/75	5/5/75	12.30	LPRSA0196840	26.1	13.4	13.4	13.94	50.79
5/6/75	5/6/75	1.70	LPRSA0196840	50.4	3.6	3.6	1.93	8.74
5/12/75	5/13/75	3.88	LPRSA0196841	44.0	7.1	7.1	4.40	18.92
5/13/75	5/13/75	3.50	LPRSA0196841	156.4	22.8	22.8	3.97	33.45
5/25/75	5/25/75	1.62	LPRSA0196841	33.5	2.3	2.3	1.84	7.19
5/30/75	5/30/75	2.20	LPRSA0196841	18.4	1.7	1.7	2.49	8.38
6/1/75	6/1/75	3.62	LPRSA0196841	312.6	47.2	47.2	4.10	58.16
Total		80.79				173.31	91.56	419.05
Average dry weather flow (MGD):			LPRSA0196837	27.20				
Combined flow to produce an overflow (MGD):			LPRSA0196837	73.00				
Total Observation Period:								
9/13/1974	9/21/1975	8952.00	LPRSA0196840	LPRSA0196841				

Overflow percentage of total time= 0.90%
Percentage CSO Overflow/Total Flow = 41.36%

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

PAP-00211907
PAP-00211916
PAP-00449588

Delavan Avenue (Newark) CSO Overflows
Newark

ADR CONFIDENTIAL - NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers	Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)
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(7/12/1975-9/27/1975)

No overflows observed during observation period.

Total	0.00	LPRSA0196683	-	-	-
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Average dry weather flow (MGD):	LPRSA0196680	0.20
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Total Observation Period:	
7/12/1975	9/27/1975
1848.00	LPRSA0196683

Overflow percentage of total time=	0.00%
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Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

PAP-00211850
PAP-00211856
PAP-00449588

Fourth Avenue (Newark) CSO Overflows
Newark

ADR CONFIDENTIAL - NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers	Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)	Dry Weather Volume (MG)	Total Volume (in system + overflow) (MG)
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(1/1/1975-7/21/1975)

2/24/75	2/24/75	1.25	LPRSA0196788	7.8	0.4	0.4	0.08	1.27
4/24/75	4/24/75	0.62	LPRSA0196788	6.2	0.2	0.2	0.04	0.59
5/2/75	5/2/75	0.30	LPRSA0196788	5.0	0.2	0.1	0.02	0.27
5/6/75	5/6/75	0.25	LPRSA0196788	8.0	0.1	0.1	0.02	0.26
5/12/75	5/13/75	1.50	LPRSA0196788	7.7	0.5	0.5	0.10	1.51
5/13/75	5/13/75	2.12	LPRSA0196788	13.2	1.2	1.2	0.14	2.62
5/16/75	5/16/75	1.37	LPRSA0196788	2.6	0.2	0.1	0.09	1.09
5/25/75	5/25/75	*	LPRSA0196788	*	*			
6/5/75	6/6/75	1.08	LPRSA0196789	4.7	0.2	0.2	0.07	0.95
7/20/75	7/21/75	1.12	LPRSA0196789	5.0	0.2	0.2	0.07	1.00
Total		9.61				2.95	0.64	9.56

* Illegible

Average dry weather flow (MGD):	LPRSA0196785	1.60
Combined flow to produce an overflow (MGD):	LPRSA0196785	16.50

Total Observation Period:				
1/1/1975	7/21/1975	4824.00	LPRSA0196788	LPRSA0196789

Overflow percentage of total time= 0.20%
Percentage CSO Overflow/Total Flow = 30.89%

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

PAP-00211900
PAP-00449588

Ivy Street (Kearny) CSO Overflows
Kearny

ADR CONFIDENTIAL - NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers	Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)	Dry Weather Volume (MG)	Total Volume (in system + overflow) (MG)
(1/1/1975-6/16/1975)								
1/1/75	1/1/75	1.00	LPRSA0196404	1.6	0.1	0.07	0.13	0.61
1/6/75	1/7/75	1.12	LPRSA0196404	2.3	0.1	0.11	0.14	0.71
1/9/75	1/9/75	6.75	LPRSA0196404	18.7	5.3	5.26	0.84	8.92
1/13/75	1/13/75	7.00	LPRSA0196404	20.7	6.0	6.04	0.88	9.83
1/18/75	1/18/75	5.50	LPRSA0196404	34.9	8.0	8.00	0.69	10.98
1/19/75	1/20/75	3.47	LPRSA0196404	2.2	0.3	0.32	0.43	2.20
1/25/75	1/25/75	5.50	LPRSA0196404	4.6	1.1	1.05	0.69	4.03
1/29/75	1/29/75	6.00	LPRSA0196404	5.4	1.3	1.35	0.75	4.60
2/23/75	2/23/75	2.75	LPRSA0196404	17.3	2.0	1.98	0.34	3.47
2/24/75	2/24/75	5.50	LPRSA0196404	26.3	6.0	6.03	0.69	9.01
5/12/75	5/13/75	1.88	LPRSA0196404	34.3	2.7	2.69	0.24	3.71
5/13/75	5/13/75	2.03	LPRSA0196404	44.3	3.8	3.75	0.25	4.85
5/16/75	5/16/75	2.83	LPRSA0196404	14.8	1.8	1.75	0.35	3.28
5/21/75	5/21/75	0.25	LPRSA0196404	1.5	Negligible	0.02	0.03	0.15
5/25/75	5/25/75	0.50	LPRSA0196404	1.0	Negligible	0.02	0.06	0.29
6/1/75	6/1/75	3.72	LPRSA0196405	147.0	22.8	22.79	0.47	24.80
6/5/75	6/5/75	0.25	LPRSA0196405	1.0	Negligible	0.01	0.03	0.15
6/5/75	6/6/75	4.08	LPRSA0196405	44.7	7.6	7.60	0.51	9.81
6/6/75	6/6/75	1.63	LPRSA0196405	26.2	1.8	1.78	0.20	2.66
6/12/75	6/13/75	9.92	LPRSA0196405	12.6	5.2	5.21	1.24	10.58
6/16/75	6/16/75	1.25	LPRSA0196405	32.5	1.7	1.69	0.16	2.37
Total		72.93				77.49	9.12	116.99
Average dry weather flow (MGD):			LPRSA0196401	3.00				
Combined flow to produce an overflow (MGD):			LPRSA0196403	13.00				
Total Observation Period:								
1/1/75	6/16/1975	3984.00	LPRSA0196404	LPRSA0196405				
Overflow percentage of total time=			1.83%		PAP-00211645			
Percentage CSO Overflow/Total Flow =			66.23%		PAP-00211647			
					PAP-00211648-9			

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Kearny/Harrison/East Newark Area, prepared for PVSC, 1976.

Johnston Avenue (Kearny) CSO Overflows
Kearny

ADR CONFIDENTIAL - NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers	Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)	Dry Weather Volume (MG)	Total Volume (in system + overflow) (MG)
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(1/1/1975-6/16/1975)

1/18/75	1/18/75	3.50	LPRSA0196369	8.5	1.2	1.24	0.09	2.30
1/29/75	1/29/75	1.92	LPRSA0196369	14.4	1.2	1.15	0.05	1.74
2/23/75	2/23/75	1.25	LPRSA0196369	20.5	1.1	1.07	0.03	1.45
2/24/75	2/24/75	0.62	LPRSA0196369	27.9	0.7	0.72	0.02	0.91
3/12/75	3/12/75	3.50	LPRSA0196369	7.1	1.0	1.04	0.09	2.10
3/14/75	3/14/75	0.67	LPRSA0196369	19.7	0.6	0.55	0.02	0.75
3/19/75	3/20/75	4.27	LPRSA0196369	41.6	7.4	7.40	0.11	8.70
3/30/75	3/30/75	1.77	LPRSA0196369	13.3	1.0	0.98	0.05	1.52
4/3/75	4/3/75	3.55	LPRSA0196369	41.8	6.2	6.18	0.09	7.26
4/24/75	4/25/75	0.50	LPRSA0196369	9.6	0.2	0.20	0.01	0.35
5/2/75	5/2/75	0.92	LPRSA0196369	12.5	0.5	0.48	0.02	0.76
5/4/75	5/5/75	4.25	LPRSA0196369	76.3	13.5	13.51	0.11	14.80
5/13/75	5/13/75	1.78	LPRSA0196369	32.5	2.4	2.41	0.05	2.95
5/16/75	5/16/75	2.72	LPRSA0196369	20.0	2.3	2.27	0.07	3.09

Total	31.22					39.20	0.82	48.69
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Average dry weather flow (MGD):	LPRSA0196366	0.63
Combined flow to produce an overflow (MGD):	LPRSA0196366	7.30

Total Observation Period:

1/1/75	6/16/1975	3984.00	LPRSA0196369	LPRSA0196370
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Overflow percentage of total time= 0.78%
Percentage CSO Overflow/Total Flow = 80.50%

Note: At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river.

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Kearny/Harrison/East Newark Area, prepared for PVSC, 1976.

PAP-00211610
PAP-00211613-4

Middlesex Street (Harrison) CSO Overflows

Harrison

ADR CONFIDENTIAL - NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers	Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)	Dry Weather Volume (MG)	Total Volume (in system + overflow) (MG)
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(4/24/1975-7/6/1975)

4/24/75	4/25/75	1.00	LPRSA0196163	1.4	0.1	0.06	0.03	0.21
5/2/75	5/2/75	0.27	LPRSA0196163	0.1	Negligible	0.00	0.01	0.04
5/16/75	5/16/75	3.95	LPRSA0196163	1.1	0.2	0.18	0.12	0.77
6/1/75	6/1/75	1.80	LPRSA0196163	6.6	0.5	0.50	0.05	0.77
6/5/75	6/6/75	2.00	LPRSA0196163	5.1	0.40	0.43	0.06	0.73
Total		9.02				1.16	0.27	2.51
Average dry weather flow (MGD):			LPRSA0196160	0.72				
Combined flow to produce an overflow (MGD):			LPRSA0196160	3.60				

Total Observation Period:

4/24/75	7/6/1975	1752.00	LPRSA0196163	LPRSA0196163
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Overflow percentage of total time= 0.51%

Percentage CSO Overflow/Total Flow = 46.17%

Note: At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river.

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Kearny/Harrison/East Newark Area, prepared for PVSC, 1976.

PAP-00211398

Nairn Avenue (Kearny) CSO Overflows
Kearny

ADR CONFIDENTIAL - NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers		Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)	Dry Weather Volume (MG)	Total Volume (in system + overflow) (MG)
(6/5/1975-8/7/1975)									
6/5/75	6/5/75	1.63	LPRSA0196283		0.6	Negligible	0.04	0.04	0.26
7/6/75	7/6/75	1.00	LPRSA0196283		0.8	Negligible	0.03	0.02	0.17
8/6/75	8/7/75	0.75	LPRSA0196283		1.2	Negligible	0.04	0.02	0.14
Total		3.38					0.11	0.08	0.56
Average dry weather flow (MGD):			LPRSA0196280		0.54				
Combined flow to produce an overflow (MGD):			LPRSA0196280		3.20				
Total Observation Period:									
6/5/75	8/7/1975	1512.00	LPRSA0196283	LPRSA0196283					
Overflow percentage of total time=			0.22%						
Percentage CSO Overflow/Total Flow =			19.85%						

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Kearny/Harrison/East Newark Area, prepared for PVSC, 1976.

PAP-00211562
PAP-00211565

Polk Street (Newark) CSO Overflows
Newark

ADR CONFIDENTIAL - NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers	Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)	Dry Weather Volume (MG)	Total Volume (in system + overflow) (MG)
(2/23/1975-8/7/1975)								
3/12/75	3/12/75	3.25	LPRSA0197152	25.6	3.5	3.5	0.22	4.89
4/24/75	4/25/75	0.67	LPRSA0197152	12.9	0.4	0.4	0.05	0.65
Total		3.92				3.83	0.27	5.54

Note: High tides cause tide gates to remain closed on some days, preventing overflow to river.

Average dry weather flow (MGD):	LPRSA0197149	1.63
Combined flow to produce an overflow (MGD):	LPRSA0197149	10.50

Total Observation Period:			
2/23/1975	8/7/1975	3960.00	LPRSA0197152 LPRSA0197152

Overflow percentage of total time= 0.10%
Percentage CSO Overflow/Total Flow = 69.05%

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

PAP-00212015
PAP-00212019

PAP-00212015

Verona Avenue (Newark) CSO Overflows
Newark

ADR CONFIDENTIAL - NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers	Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)	Dry Weather Volume (MG)	Total Volume (in system + overflow) (MG)
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(1/1/1975-6/29/1975)

1/6/75	1/7/75	3.20	LPRSA0196644	3.6	0.5	0.5	0.21	3.01
1/9/75	1/9/75	4.00	LPRSA0196644	6.7	1.1	1.1	0.27	4.28
1/29/75	1/29/75	5.90	LPRSA0196644	4.2	1.0	1.0	0.39	5.70
3/12/75	3/12/75	7.25	LPRSA0196644	7.3	2.2	2.2	0.48	7.94
3/14/75	3/14/75	3.25	LPRSA0196644	1.2	0.2	0.2	0.22	2.74
3/19/75	3/20/75	6.38	LPRSA0196644	7.9	2.1	2.1	0.42	7.15
3/30/75	3/30/75	2.62	LPRSA0196644	3.6	0.4	0.4	0.17	2.47
4/3/75	4/3/75	5.50	LPRSA0196644	5.6	1.3	1.3	0.36	5.64
4/24/75	4/24/75	2.62	LPRSA0196644	4.7	0.5	0.5	0.17	2.59
4/24/75	4/25/75	2.37	LPRSA0196644	2.4	0.2	0.2	0.16	2.11
4/25/75	4/26/75	1.00	LPRSA0196644	0.7	0.0	0.0	0.07	0.82
5/2/75	5/2/75	1.37	LPRSA0196644	2.7	0.2	0.2	0.09	1.24
5/4/75	5/5/75	4.42	LPRSA0196644	1.5	0.3	0.3	0.29	3.78
5/6/75	5/6/75	0.75	LPRSA0196644	3.9	0.1	0.1	0.05	0.72
5/16/75	5/16/75	3.25	LPRSA0196644	2.9	0.4	0.4	0.22	2.97
6/28/75	6/28/75	0.66	LPRSA0196645	53.3	1.5	1.5	0.04	1.99
Total		54.54				11.96	3.61	55.14
Average dry weather flow (MGD):			LPRSA0196641	1.59				
Combined flow to produce an overflow (MGD):			LPRSA0196641	19.00				

Total Observation Period:			
1/1/1975	6/29/1975	4296.00	LPRSA0196644 LPRSA0196645

Overflow percentage of total time= 1.27%
Percentage CSO Overflow/Total Flow = 21.70%

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

PAP-00211826
PAP-00211820

NPDES	CSO Municipality	CSO Name	Area Covered square miles	Area Covered acres	CSO Percentage Overflow Time	Percentage CSO Flow in Overflow	CSO Overflow Time Percentage x CSO Volume Percentage	CSO Observation Start Date	CSO Observation End Date	Comments
011/H-002	Harrison	Cleveland Avenue	0.017	11	0.21%	34.80%	0.073%	2/5/1975	6/16/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
015/H-006	Harrison	Bergen Street	0.113	72	0.33%	64.09%	0.211%	7/6/1975	9/12/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
010/H-001	Harrison	New (Hamilton) Street	0.05	32	0.45%	74.58%	0.337%	5/12/1975	7/6/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
014/H-005	Harrison	Middlesex Street	0.097	62	0.51%	46.17%	0.238%	4/24/1975	7/6/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
013/H-004	Harrison	Dey Street	0.009	6	0.60%	50.64%	0.306%	6/5/1975	7/6/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
012/H-003	Harrison	Harrison Avenue	0.105	67	1.13%	62.02%	0.702%	4/24/1975	6/6/1975	Short observation period.
016/H-007	Harrison	Worthington Avenue	0.277	177	NA	NA	NA	5/12/1975	5/21/1975	No metering done at this location.
Total of Harrison CSOs			0.668	427	3.24%	332.31%				
Worthington Avenue median					0.48%	56.33%	0.27216093382032900% median			

Worthington Avenue (Harrison) CSO Overflows
Harrison

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CSO Overflow Start	CSO Overflow End	Duration (hours)	Source Bates Numbers	Average Overflow Rate (MGD)	Cited Overflow Volume (MG)	Calculated Overflow Volume (MG)	Dry Weather Volume (MG)	Total Volume (in system + overflow) (MG)
--------------------	------------------	------------------	----------------------	-----------------------------	----------------------------	---------------------------------	-------------------------	--

(5/12/1975-5/21/1975)

This CSO was not metered for overflows.

TotalNA

Average dry weather flow (MGD):	LPRSA0196229	2.00
Combined flow to produce an overflow (MGD):	LPRSA0196229	5.90

Total Observation Period:			
5/12/1975	5/21/1975	216.00	LPRSA0196199 LPRSA0196199

Overflow percentage of total time=NA
Percentage CSO Overflow/Total Flow =NA

Note: No metering done at this location.

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Kearny/Harrison/East Newark Area, prepared for PVSC, 1976.

PAP-00211468
PAP-00211471

NPDES	CSO Municipality	CSO Name	CSO Percentage Overflow Time	Percentage CSO Flow in Overflow	CSO Overflow Time Percentage x CSO Volume Percentage	CSO Observation Start Date	CSO Observation End Date	Comments
028/N-001	Newark	Verona Avenue	1.27%	21.70%	0.28%	1/1/1975	6/29/1975	
030/N-003	Newark	Herbert Place	1.40%	39.56%	0.55%	1/1/1975	6/29/1975	
032/N-005	Newark	Fourth Avenue	0.20%	30.89%	0.06%	1/1/1975	7/21/1975	One overflow observation is illegible.
033/N-006	Newark	Clay Street	0.90%	41.36%	0.37%	9/13/1974	9/21/1975	
033/N-006C	Newark	Passaic Street	0.14%	46.55%	0.06%	7/6/1975	10/18/1975	Short observation period. Killam notes that during observation period, high tides caused tide gates to remain closed on some days, preventing overflow to river.
036/N-009	Newark	Rector Street	0.46%	40.16%	0.18%	1/25/1975	8/7/1975	
037/N-010	Newark	Saybrook Place	0.46%	50.20%	0.23%	1/8/1975	6/29/1975	High tides cause tide gates to remain closed on some days, preventing overflow to river.
038/N-011	Newark	City Dock	0.11%	61.80%	0.07%	1/1/1975	7/20/1975	High tides cause tide gates to remain closed on some days, preventing overflow to river.
039/N-012	Newark	Jackson Street	0.05%	54.58%	0.03%	5/1/1975	9/24/1975	High tides cause tide gates to remain closed on some days, preventing overflow to river. Short observation period.
040/N-013	Newark	Polk Street	0.10%	69.05%	0.07%	2/23/1975	8/7/1975	High tides cause tide gates to remain closed on some days, preventing overflow to river.
041/N-014	Newark	Freeman Street	0.47%	32.87%	0.15%	2/23/1975	4/26/1975	Short observation period.
008/E-001	East Newark	Central Avenue	0.37%	61.94%	0.23%	4/24/1975	6/6/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
010/H-001	Harrison	New (Hamilton) Street	0.45%	74.58%	0.34%	5/12/1975	7/6/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
011/H-002	Harrison	Cleveland Avenue	0.21%	34.80%	0.07%	2/5/1975	6/16/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
012/H-003	Harrison	Harrison Avenue	1.13%	62.02%	0.70%	4/24/1975	6/6/1975	Short observation period.

013/H-004	Harrison	Dey Street	0.60%	50.64%	0.31%	6/5/1975	7/6/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
014/H-005	Harrison	Middlesex Street	0.51%	46.17%	0.24%	4/24/1975	7/6/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
015/H-006	Harrison	Bergen Street	0.33%	64.09%	0.21%	7/6/1975	9/12/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
019/K-003	Kearny	Bergen Avenue (West)	3.45%	28.68%	0.99%	4/24/1975	5/7/1975	Short observation period.
020/K-004	Kearny	Nairn Avenue	0.22%	19.85%	0.04%	6/5/1975	8/7/1975	Short observation period.
021/K-005	Kearny	Marshall Street	0.39%	56.08%	0.22%	2/5/1975	4/3/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river. Short observation period.
022/K-006	Kearny	Johnston Avenue	0.78%	80.50%	0.63%	1/1/1975	6/16/1975	At times, tidal levels caused tide gates to remain closed during part of rainfall, resulting in reduced overflow to river.
023/K-007	Kearny	Ivy Street	1.83%	66.23%	1.21%	1/1/1975	6/16/1975	
024/K-008	Kearny	Bergen Avenue (East)	1.40%	63.04%	0.89%	1/6/1975	7/21/1975	
025/K-009	Kearny	Tappan Street	0.50%	28.10%	0.14%	2/23/1975	9/24/1975	
026/K-010	Kearny	Dukes St	0.15%	61.02%	0.09%	5/1/1975	10/24/1975	
017/K-001	Kearny	Stewart Avenue	0.35%	48.49%	0.17%	8/6/1975	10/24/1975	Short observation period.
018/K-002	Kearny	Washington Avenue	0.22%	31.33%	0.07%	6/5/1975	9/27/1975	Short observation period.
	Yantacaw	Median	0.45%	49.35%	0.22%			

Note: All of the CSOs with no data have been removed

ATTACHMENT O
MAY 2020 KOCH REPORT

ARR2899

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CONTRIBUTIONS OF CONTAMINANTS OF CONCERN (COCs) TO THE PASSAIC RIVER

Prepared by

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May 22, 2020

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EXHIBIT 1	Resume of Gayle Schlea Koch
EXHIBIT 2	PVSC Discharges to the Passaic River
EXHIBIT 3	Non-Participating Potential PCB Parties

APPENDIX A	Documents Considered
APPENDIX B	Sources of COCs to the LPRSA
APPENDIX C	Examples of Non-Participating Companies that Likely Discharged PCBs

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1. PURPOSE

At the request of counsel for the Lower Passaic River Study Area ("LPRSA") Small Parties Group ("SPG"), I was asked to evaluate, based upon available resources, the relative contributions of the main sources of Contaminants of Concern ("COCs") to the LPRSA (the "Site"). In particular, this report evaluates the collective contributions of parties not participating in an allocation proceeding relative to the collective contributions of the Participating Allocation Parties ("PAPs"). This report does not attempt to identify or otherwise assess the existence of orphan shares relating to contamination in the LPRSA, as a solvency review has not been conducted.

2. QUALIFICATIONS

As a Principal and Co-Founder of Axlör Consulting LLC, I work on solutions to economic, environmental, insurance, and product liability issues that arise in litigation, negotiation, business, and regulatory matters. I have been an environmental and business consultant for over 35 years, during which time I have worked on many projects involving contaminated sediment sites and conceptual site models. My experience includes modeling historic industrial processes and the development of mass balances on behalf of private parties and government agencies for litigation and management purposes. I have been retained numerous times regarding complex allocation issues involving evaluation of historic contamination sources to rivers, harbors, groundwater, and land. I have co-authored articles on allocation and have lectured on allocation issues in the context of environmental litigation risk analysis and as a component of the ASTM International best practice standard that addresses environmental allocation issues,¹ for which I have served as technical contact since the standard was first approved in 2001.

¹ ASTM Standard E2137-17, "Standard Guide for Estimating Monetary Costs and Liabilities for Environmental Matters."

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I hold a B.S. degree in chemical engineering; a B.S. degree in humanities and engineering (in the Science, Technology & Society Program with a focus on environmental studies); and an M.S. degree in management science (with concentrations in applied economics, corporate strategy, and management of technological innovation) from the Massachusetts Institute of Technology. As part of this education and related research, I studied industrial processes and mass balances; modeled flows of contaminants in air and water; studied environmental science, law and regulations; and developed complex quantitative analyses for decision-making.

Additional information regarding my experience, including examples of mass balance and allocation projects, is contained in my resume, attached in Exhibit 1.

3. METHODOLOGY AND DOCUMENTS CONSIDERED

To develop this report, I reviewed the large collection of Site-related documents listed in Appendix A. I have conducted extensive research to identify the historical sources of COCs to the LPRSA, including review of:

- Numerous historical documents related to industrial development in the Passaic River (“River”) area;
- LPRSA investigations conducted for the EPA and other parties;
- Numerous documents related to operations and discharges of the Passaic Valley Sewerage Commission (“PVSC”) and local municipalities; and
- Scientific studies related to sources of specific COCs to the Passaic River watershed, including studies of sources of heavy metals (copper, lead and mercury) to the PVSC;

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studies conducted by the New York Academy of Sciences related to PCBs, dioxins,² mercury, and PAHs; dioxin fingerprinting studies; and studies of copper and lead mass flows.

With the available documents, I estimated the number of parties that likely contributed COCs to the LPRSA and, to the extent feasible, quantified the order of magnitude of these COC contributions. I also researched the contributions of the PAPs relative to the main sources of COCs to the LPRSA. The documents I relied upon for this report, which are typical of those normally relied upon by allocation experts examining the history of pollutant discharges at a site, are cited in the footnotes.

This report is based on the documentation reviewed to date. I will continue to review information as it is made available to me, and may update my opinions accordingly. The opinions offered herein are offered to a reasonable degree of professional certainty.

4. EXECUTIVE SUMMARY

4.1 Background

The current allocation proceeding is being conducted to evaluate the relative contributions by the PAPs of COCs in Operable Unit 2 ("OU-2"), defined as the lower 8.3-mile portion of the 17-

² The NYAS study used the term "dioxins" as shorthand for the suite of 210 polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran compounds (PCDDs/PCDFs), including 2,3,7,8-TCDD and "dioxin-like compounds" such as coplanar PCBs, polychlorinated naphthalenes, and brominated and chlorinated/brominated dioxins. Of these, the compound 2,3,7,8-TCDD is the most toxic. The report also used "dioxins" to refer to data sets where fewer than the 210 compounds were measured. This report follows the NYAS convention and uses "dioxins" to mean 2,3,7,8-TCDD, TCDD toxic equivalents ("TEQ"), or PCDDs/PCDFs, unless otherwise noted. Source: G.R. Munoz and M.A. Panero, New York Academy of Sciences, Pollution Prevention and Management Strategies for Dioxins in the New York/New Jersey Harbor, August 2006, pp.33-34.

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mile LPRSA.³ Due to the nature of historical contaminant transport into and within the entire LPRSA, discharges of COCs into any portion of the LPRSA are all potential contributors of COCs in the LPRSA, including OU-2. Therefore, when conducting an equitable allocation for the OU-2 COCs, it is important to consider all historical discharge sources to the LPRSA. As my evaluation shows, many of the sources of such discharges are not included in this allocation.

The COCs identified in EPA's 2016 Record of Decision ("ROD") for OU-2 of the LPRSA are:⁴

- Dioxins and furans
- Polychlorinated biphenyls ("PCBs")
- Mercury
- Dichlorodiphenyltrichloroethane ("DDT")
- Copper
- Dieldrin
- Polycyclic aromatic hydrocarbons ("PAHs")
- Lead

EPA has recognized that there are numerous sources of these COCs, including industrial point sources as well as regional sources such as the Upper Passaic River, Newark Bay, tributaries, and municipal and PVSC and other municipal sewer overflows.⁵ As discussed in Section 5 below, EPA's Remedial Investigation indicates that the largest ongoing source of contamination in OU-2 sediments is, by far, the resuspension of legacy (*i.e.*, historical) contamination in sediments. Thus, in performing an allocation for OU-2, it is critical to have as complete a picture as possible of all of the historical sources of contamination to OU-2. This report shows that COCs in OU-2

³ U.S. Environmental Protection Agency, Region II, Record of Decision: Lower 8.3 Miles of the Lower Passaic River, Part of the Diamond Alkali Superfund Site, March 3, 2016, Decision Summary, p. 1.

⁴ U.S. Environmental Protection Agency, Region II, Record of Decision: Lower 8.3 Miles of the Lower Passaic River, Part of the Diamond Alkali Superfund Site, March 3, 2016, Decision Summary, pp. 14-16.

⁵ U.S. Environmental Protection Agency, Region II, Record of Decision: Lower 8.3 Miles of the Lower Passaic River, Part of the Diamond Alkali Superfund Site, March 3, 2016, Decision Summary, pp. 16-19.

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came from sources far outnumbering the allocation participants and from well beyond the areas considered for the allocation.

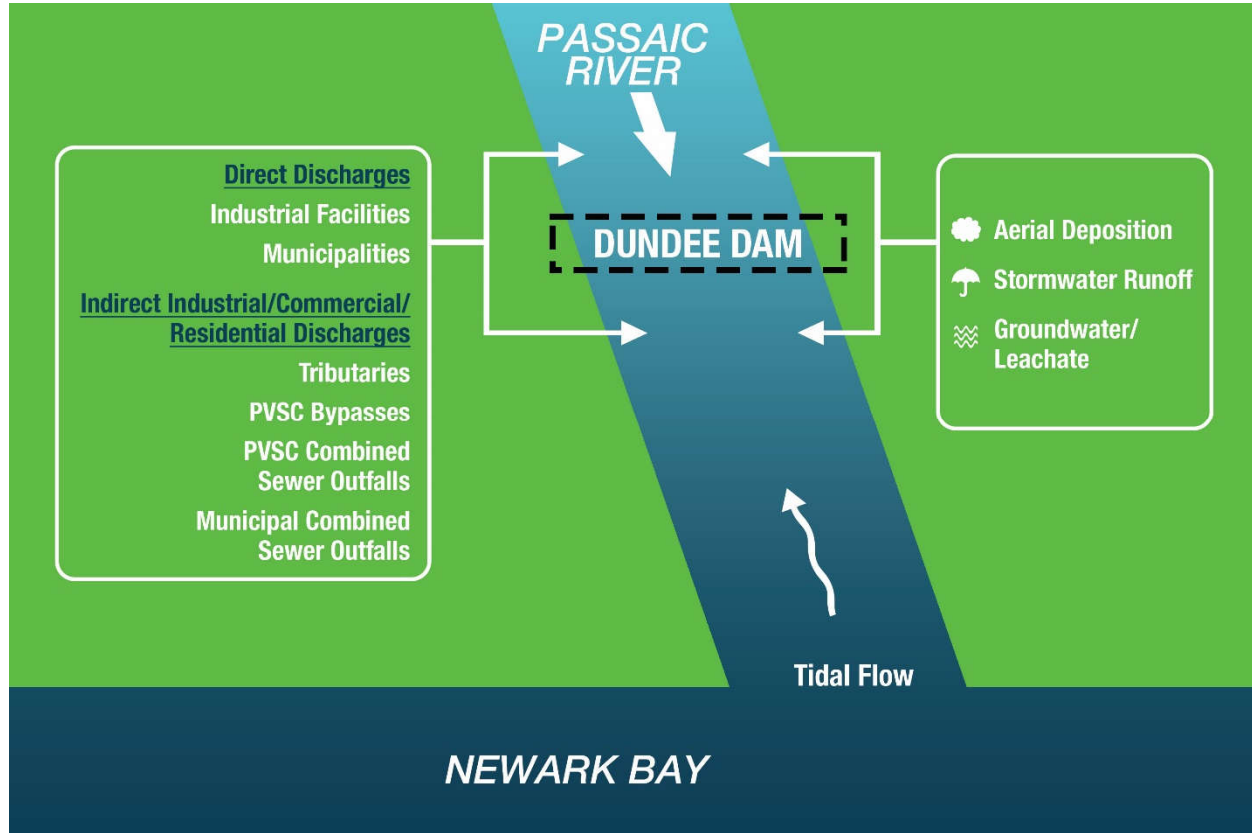
As illustrated in Figure 1, historically, COCs from industrial, commercial, and residential sources to the LPRSA were:

- Discharged directly to the Passaic River and its tributaries;
- Transported to the Passaic River via individual municipal and Passaic Valley Sewerage Commission (“PVSC”) direct discharges, bypasses and combined sewer overflows (“CSOs”);
- Transported over Dundee Dam from the Upper Passaic River and its tributaries;
- Transported from Newark Bay via twice-daily tidal flows; and
- Discharged through aerial deposition, groundwater/leachate flow, and stormwater runoff.

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Figure 1. Sources of COCs to the LPRSA



Municipal sewerage systems, and particularly the PVSC, were also significant historical contributors of COCs from both above and below Dundee Dam. While the PVSC interceptor system conveyed much of the wastewater from its collection area to the PVSC treatment plant at Newark Bay and discharged most of the treated effluent in New York Harbor,⁶ discharges of untreated sewage into the Passaic River via the PVSC and municipal bypasses and combined sewer overflows alone could account for a material portion of the mass of certain COCs currently found in the OU-2 sediments. The PVSC and municipalities are not participating parties in the

⁶ Affidavit of Seymour A. Lubetkin, January 6, 1994 [846680004-846680005]; Memo from R. C Smith to PVSC, February 17, 1947, p. 2 [LPRSA0198629].

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allocation, despite the fact that they were, at a minimum, arrangers and transporters of COCs to the LPRSA.

4.2 Conclusions

My investigation of industrial sources as well as residential and commercial sources of COCs to the LPRSA concludes that the PAPs account for only a small percentage of the historical industrial dischargers into the PVSC, municipal, and river systems that were sources of COCs in the LPRSA. Specifically:

1. Of the approximately 11,800 historical industrial dischargers to the Passaic River that were identified through industrial directories both above and below Dundee Dam, **98.6 percent are not participating in this allocation effort.**
2. While the predominant discharger of dioxin and DDT, the Diamond Alkali facility, is included in the allocation, **the majority of sources of other COCs are not included in the allocation.**
3. Based on historical PVSC research regarding heavy metals, **parties not participating in this allocation comprise 81.5 percent of the dischargers of heavy metals** to the PVSC sewage system in the late 1970s.
4. Given research showing that **over 450 likely PCB users in the PVSC service area are not included in this allocation**, PCB-related parties are significantly underrepresented in the allocation.
5. Other historical sources also contributed to COCs in the LPRSA. In addition to industrial discharges, residential and commercial discharges contributed COCs. COCs

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from numerous tributaries discharged to the Passaic River, both above and below Dundee Dam. Tidal flow also brought contaminants upstream into the LPRSA from Newark Bay. Atmospheric deposition and groundwater/leachate flow also contributed COCs to the LPRSA.

Ultimately, based on my investigation, it is clear that the vast majority of the sources of COCs to OU-2 of the LPRSA (other than dioxins and DDT, for which the Diamond Alkali facility is the predominant source) are not included in the current allocation.

5. BACKGROUND: COCs IN THE LPRSA

According to the 2016 ROD issued by EPA for the lower 8.3 miles of the Lower Passaic River, the eight COCs that currently pose the highest potential risk to human health and/or the environment are:⁷

- Dioxins and furans
- Polychlorinated biphenyls ("PCBs")
- Mercury
- Dichlorodiphenyltrichloroethane ("DDT")
- Copper
- Dieldrin (HEOD or 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4 α ,5,6,7,8,8 α -octahydro-1,4-endo,exo-5,8-dimethanonaphthalene)
- Polycyclic aromatic hydrocarbons ("PAHs")
- Lead

⁷ U.S. Environmental Protection Agency, Region II, Record of Decision: Lower 8.3 Miles of the Lower Passaic River, Part of the Diamond Alkali Superfund Site, March 3, 2016, pp. 14-16.

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EPA has estimated the mass of several COCs in OU-2 sediments, as shown in Table 1 below (prior to Tierra Phase 2 Removal).⁸

Table 1. Estimated Mass of COCs in Lower 8.3 Miles of LPRSA*

COC	Estimated Total Mass in OU-2 (kg)	Estimated Total Mass in OU-2 (lb)
2,3,7,8-TCDD	38	84
Total 4,4'-DDx	27,000	59,525
Total PCBs	26,000	57,320
Mercury	42,000	92,594
Copper	2,100,000	4,629,708
Lead	3,200,000	7,054,792
Dieldrin	390	860
Total PAHs	410,000	903,895

* This table does not reflect the relative risk of each COC, which is not addressed in this report.

EPA's 2014 Remedial Investigation for OU-2 concludes that resuspension of sediments in the LPRSA through scouring and tidal activity is the primary current (*i.e.*, ongoing) source of COCs to the water and surface sediments, as shown in Table 2.⁹ For example, Table 2 shows that the resuspension of legacy contamination accounts for 97 percent of the 2,3,7,8-TCDD and 81 percent of the PCBs in OU-2 sediments.

⁸ While interim activities removed some masses of COCs, for allocation purposes it is important to look at the total mass in the LPRSA driving the cleanup. Source: EPA, Additional Contaminant Inventory Analysis for Lower Eight Miles of the Lower Passaic River, April 2019, Table 1.

⁹ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, pp. ES-8 to ES 10 and pp. 6-1 to 6-7.

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Table 2. Remedial Investigation Estimates of Current COC Sources to LPRSA (%)

Contaminant of Concern (COC)	Upper Passaic River (above Dundee Dam)	Newark Bay	Tributaries	CSOs and SWOs	LPRSA Resuspension of Historical/Legacy Contamination
Solids	32%	14%	6%	1%	48%
2,3,7,8-TCDD	0%	3%	0%	0%	97%
Total TCDD	3%	5%	0%	0%	92%
DDE	10%	8%	3%	1%	78%
Total PCBs	11%	6%	1%	0%	81%
Mercury	11%	14%	0%	0%	75%
Copper	14%	12%	1%	1%	72%
Lead	19%	7%	2%	2%	71%
Chlordane*	32%	3%	11%	3%	52%
PAHs:					
Benzo(a)pyrene	53%	7%	5%	1%	33%
Fluoranthene	47%	5%	6%	2%	40%

*May have similar sourcing to dieldrin.

In addition, while the Remedial Investigation identifies additional sources of COCs in its Conceptual Site Model (“CSM”), the investigation concluded that the following additional sources are not current significant contributors of most COCs to the LPRSA:¹⁰

- Upper Passaic River (above Dundee Dam)
- Newark Bay (tidal flow)
- Tributaries (e.g., Saddle River, Third River, Second River)
- CSOs and stormwater outfalls (“SWOs”) from municipalities and the PVSC
- Industrial sources to the main stem of the Passaic River

¹⁰ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, pp. 6-1 to 6-7.

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- Atmospheric deposition
- Groundwater and leachate flow¹¹

However, according to the Remedial Investigation's CSM, the Upper Passaic River and Newark Bay combined currently contribute between 15-26 percent of each of Total PCBs, DDE (as an analog for DDX), copper, lead, and mercury; 53 percent of benzo(a) pyrene and 47 percent of fluorathene (PAHs); and insignificant dioxins.¹² In addition, as shown in Table 2, the Upper Passaic River currently accounts for 32 percent, and Newark Bay accounts for 14 percent of the solids flow into the LPRSA. Since each of the COCs tends to bind to fine solids, it is important to note the contribution of solids flowing into the LPRSA from these areas. Limiting the model to only current sources of COCs to the sediments allowed for significant simplification of the CSM to one current source: resuspension of the existing sediments. However, historically, the contributions of COCs from above Dundee Dam and from Newark Bay, as well as from indirect sources, were likely contributing a greater mass of COCs to the LPRSA than currently, given higher historical discharges of industrial effluent and emissions from sources that would not have incorporated or been limited by current environmental regulatory controls (such as required industrial wastewater pre-treatment, or the DDT and PCB bans in the 1970s).

Further, the cessation of historical dredging in the LPRSA increased the accumulation of contamination in LPRSA sediments. As noted in the 2016 ROD for OU-2, after the cessation of broad navigational dredging in 1950, "[t]he coincidence of chemical disposal in the river and the filling-in of the navigation channel created ideal conditions for the accumulation of contaminated

¹¹ This report does not evaluate the contributions of groundwater and leachate flow from individual facilities, some of which may have significant flows.

¹² The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 6-5.

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sediments in the Lower Passaic River.”¹³ This effect, combined with a salt wedge driven by tidal action moving upstream into the LPRSA from Newark Bay, inhibited the movement of suspended solids out of the River and trapped them behind the salt wedge.¹⁴ Since the COCs were hydrophobic, they tended to bind to organic material in the fine silt particles, and were then deposited as sediments.¹⁵

Consideration of the historical sources of the legacy contamination identified in the surface and deeper sediments is necessary to accurately characterize the relative responsibility of the PAPs for their contributions of COCs to the LPRSA. Research and evaluation beyond the limited information provided in the Remedial Investigation and its Conceptual Site Model shows that the PAPs (other than the Diamond Alkali facility) represent only a very small fraction of the overall profile of contributors to COCs in LPRSA sediments. For DDT and dioxin, the Diamond Alkali facility was the predominant contributor to the LPRSA sediments, as discussed in Appendix B.

6. HISTORICAL SOURCES OF COCs TO THE LPRSA

Because the LPRSA acted as a sink for contaminants from a multitude of sources, including those from above Dundee Dam and from Newark Bay,¹⁶ it is important to evaluate all such sources of COCs over a broad timespan. For example, looking at dated sediment cores to examine historical

¹³ U.S. Environmental Protection Agency, Region II, Record of Decision: Lower 8.3 Miles of the Lower Passaic River, Part of the Diamond Alkali Superfund Site, March 3, 2016, Decision Summary, p. 17.

¹⁴ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 6-1.

¹⁵ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 6-3.

¹⁶ See, for example, U.S. Environmental Protection Agency, Region II, Record of Decision: Lower 8.3 Miles of the Lower Passaic River, Part of the Diamond Alkali Superfund Site, March 3, 2016, Decision Summary, pp. 16-19; R.J. Chant, D. Fugate, and E. Garvey, “The Shaping of An Estuarine Superfund Site: Roles of Evolving Dynamics and Geomorphology,” *Estuaries and Coasts*, September 10, 2010.

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contributions from above Dundee Dam to the LPRSA, one contractor working for EPA determined:

Dated cores collected above head-of-tide on the Upper Passaic do not provide as extensive a historical record. Nonetheless, the core data are sufficient to suggest that the majority of historical loads of cadmium, lead, mercury, and Total PCB to the Lower Passaic originated in the Upper Passaic River above the Dundee [D]am. Historical loads of copper were more evenly split between Upper Passaic and Lower Passaic sources. Dated sediment cores from the Upper and Lower Passaic River further indicate that relatively little of the Total DDT and much less than 1 percent of the 2,3,7,8-TCDD contamination in the Lower Passaic River originated above the Dundee Dam historically.¹⁷

This finding supports the conclusion that while a majority of the mass of several COCs (including PCBs) in the LPRSA sediments originated from sources above Dundee Dam, the contaminant mass of TCDD and DDT, which is largely related to the Diamond Alkali facility as discussed in Appendix B, had relatively little input from above the Dundee Dam. For copper, on the other hand, the reported historical loads were more evenly split between Upper Passaic and Lower Passaic sources.

The sections below evaluate all of the historical sources of COCs in the LPRSA more broadly by examining municipal and industrial development around the Passaic River above and below Dundee Dam, the tributaries to the Passaic River, the discharges through municipal and PVSC bypasses and CSOs, atmospheric deposition, and tidal flow into the LPRSA from Newark Bay.¹⁸

¹⁷ E.A. Garvey, A.M. Accardi-Dey, J. Atmadja, S. Gbondo-Tugbawa, S. McDonald, and E. Zamek, Malcolm Pirnie, Inc., "The Interplay of Dredging and Discharges: A Conceptual Model of Contamination in the Lower Passaic River," presented at the 18th World Dredging Congress 2007, Lake Buena Vista, Florida, May 30, 2007, p. 850.

¹⁸ Since there is limited information available providing measurements of historical sources of COCs, information is also presented on current measurements for the various sources of COCs. While current measurements may be indicative of likely historical sources, the reader is advised to keep the distinction of current versus historical measurements in mind, as this distinction is relevant to allocation considerations.

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6.1 Municipal and Industrial Development

The first European colony on the Passaic River was established in 1666 in Newark, with settlements soon expanding throughout the area. By 1671, Newark had a mill in operation to grind corn, powered by the First River. In 1719, copper was found on a tract in Arlington/North Arlington, and a mine was established which operated until the mid-1800s. Iron was also discovered, leading to the establishment of at least five forges on the Whippany River and its tributaries during the late 1600s to early 1700s. The first sawmill was built on the Passaic River in approximately 1727. Various types of mills, such as sawmills, gristmills, paper mills, and flour mills, were erected to use the water power of the Passaic River and its tributaries, with some operating until the early 1900s.¹⁹

Industrial development in Paterson was fueled by targeted investments in the area. In 1791, Treasury Secretary Alexander Hamilton joined with others to form the Society for Establishing Useful Manufactures (“S.U.M.”) to promote industrial development through tax advantages, navigation construction projects, power development, and financing in the State of New Jersey. Paterson was selected as the site for this project, with Great Falls to provide power. Operations were established to produce cotton yarn; spun flax, hemp and wool; woven stockings; and cotton fabrics, cotton wick, and ginned cotton. After financial problems shuttered these operations in 1797, a paper mill was built in 1804, with some of the other mill sites leased to other manufacturers. With the advent of the War of 1812, manufacturing in Paterson increased, with eleven cotton mills and other mills such as a rolling mill, nail factory and wire factory in operation by 1814. Following the enactment of tariffs on foreign goods in 1816, Paterson saw strong

¹⁹ N.F. Brydon, *The Passaic River: Past, Present, Future*, New Brunswick, NJ: Rutgers University Press, 1974, pp. 48-53, 66-69, 127-132, and 152 [MAXUS1394116-1394118, 1394124-1394125, 1394154-1394157, and 1394167].

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industrial growth in a variety of industries such as the cotton, locomotive engine, iron products, silk, flax spinning, woolens, dyeing, printing, paper, and chemical industries.²⁰

In Passaic, construction of Dundee Dam by Dundee Manufacturing Company in 1845 led to the erection of woolen mills, paper mills, print works, cotton bleaching/printing works, and steam engine casting works along the canal next to the dam by the 1870s. By the end of the 1800s, ten thousand workers were employed in the area around Passaic in the production of cotton prints, woolen goods, rubber-insulated wire, artificial leather, chemicals, stove polish, boxes, and other materials. Further down the Passaic River, mills were also located along the Third River (woolen mills, board milling, paper mills) and Second River (copper factory, print mill, brass rolling mills, chemical factory). By 1894, the Geological Survey identified the following mills along the Passaic River and its major tributaries: 12 grist/flour mills, 15 sawmills, 27 fabric/fiber mills, 3 paper mills, 11 rolling mills/forges/iron works, and 11 miscellaneous mills.²¹

Industrial development in the Passaic River watershed was extensive and occurred over a long period of time. In the Natural Resource Damage Assessment Plan for the Diamond Alkali Superfund Site, the U.S. Department of Interior and National Oceanic and Atmospheric Administration state, "By [1922], nearly 1,000 industrial firms are located in Newark; primary industries include clothing and jewelry manufacturers, printing and publishing, foundry products, and leather goods."²² New Jersey industrial directories from the early 1920s, 1950s, and 1970s catalogue the extensive industrial development of thousands of facilities in Newark, Paterson,

²⁰ N.F. Brydon, *The Passaic River: Past, Present, Future*, New Brunswick, NJ: Rutgers University Press, 1974, pp. 135-143 [MAXUS1394158-1394162].

²¹ N.F. Brydon, *The Passaic River: Past, Present, Future*, New Brunswick, NJ: Rutgers University Press, 1974, pp. 143-152 [MAXUS1394162-1394167].

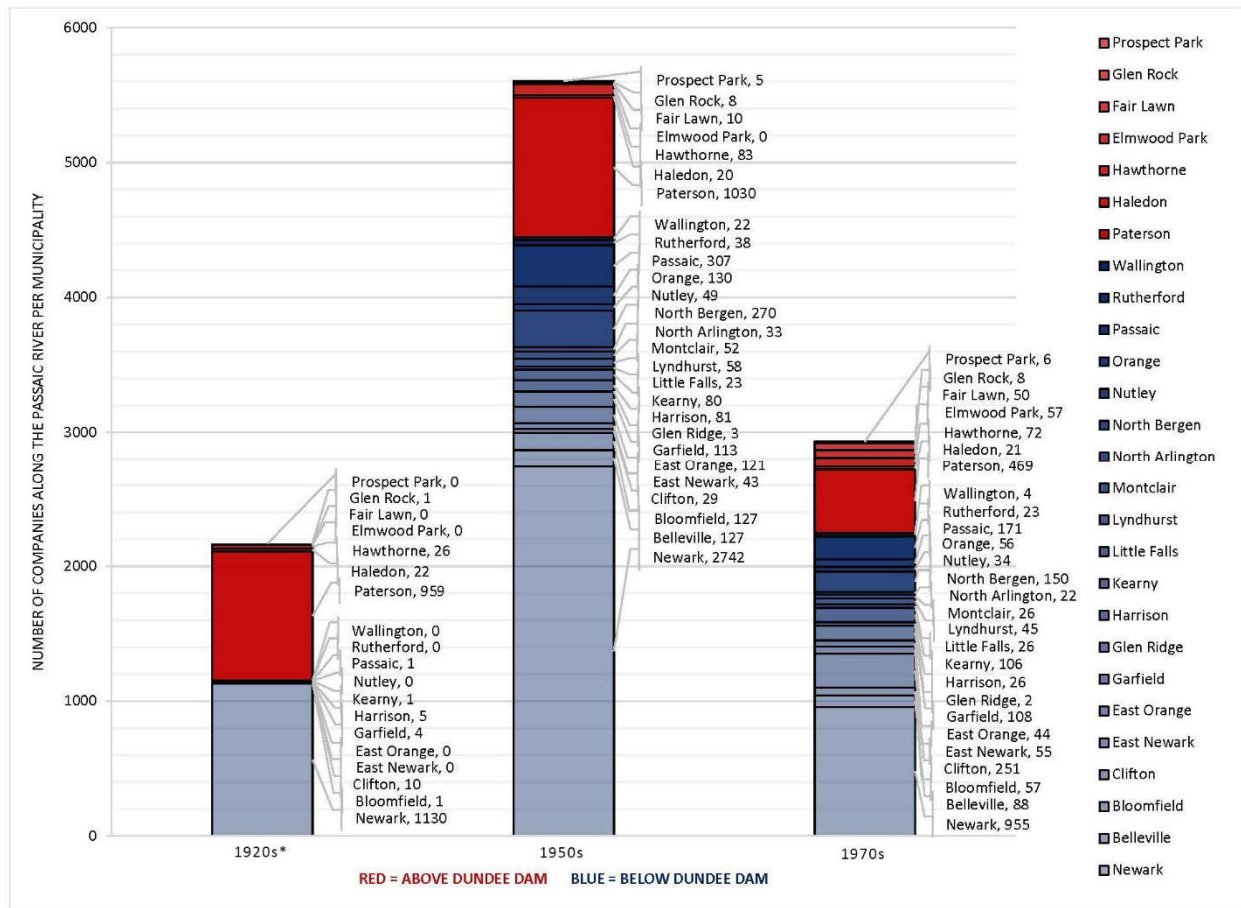
²² U.S. Department of the Interior/U.S. Fish and Wildlife Service and U.S. Department of Commerce/National Oceanic and Atmospheric Administration, Final Natural Resource Damage Assessment Plan for the Diamond Alkali Superfund Site, January 2020, Exhibit 1-2, pp. 12-13, referencing data from the Merchants Association of Newark, 1922.

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and the other municipalities that discharged their sewers directly to the Passaic River before eventually connecting to the PVSC, as shown below in Figure 2.²³ (As described further in Sections 6.3 and 6.4, connection to the PVSC did not eliminate municipal discharges to the River.)

Figure 2. Number of Industrial Facilities in PVSC Municipalities



* 1920s data is partial data from available directories and is therefore low.

²³ New Jersey Industrial Directories: Belleville, 1952/53, 1974; Bloomfield, 1952/53, 1974; Clifton, 1954/55, 1970; East Newark, 1952/53, 1974; East Orange, 1954/55, 1973; Elmwood Park, 1975, Fair Lawn, 1946, 1975; Garfield, 1956/57, 1973; Glen Ridge, 1952/53, 1973; Glen Rock, 1952/53, 1975; Haledon, 1954/55, 1973; Harrison, 1952/53, 1974; Hawthorne, 1956/57, 1974; Kearny, 1952/53, 1974; Little Falls, 1952/53, 1973; Lyndhurst, 1952/53, 1973; Montclair, 1952/53, 1973; Newark, 1920, 1923, 1952/53, 1974; North Arlington, 1952/53, 1974; North Bergen, 1952/53, 1974; Nutley, 1952/53, 1974; Orange, 1952/53, 1974; Passaic, 1952/53, 1974; Paterson, 1954/55, 1975; Prospect Park, 1946, 1975; Rutherford, 1952/53, 1973; Wallington, 1954/55, 1973.

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6.2 Tributaries

As described in the Remedial Investigation, the Passaic River is 80 miles long, fed by a 935-square mile watershed that includes numerous tributaries to the River, and emptying into Newark Bay.²⁴ The River begins north of Millington in Wendham, New Jersey, flowing northeast to Great Piece meadows north of Caldwell, turning east to Great Falls just above Paterson, then turning south to flow over Dundee Dam and on to Newark Bay. The Passaic River watershed drains land from the eight New Jersey counties of Bergen, Essex, Hudson, Morris, Passaic, Somerset, Sussex and Union, as well as the two New York counties of Rockland and Orange.²⁵ The PVSC identified 60 tributaries to the Passaic River between Great Falls in Paterson and the mouth of Newark Bay.²⁶ A map of the Passaic River basin and major tributaries is shown in Figure 3 below.²⁷

In the Remedial Investigation, EPA notes that tributaries are currently small sources for COCs in recently-deposited sediments of the LPRSA (see Table 2).²⁸ However, according to EPA's findings, tributaries still contribute 6 percent of the solids flow into the LPRSA. While historical measurements for these inputs are not available, historically, it is likely that the tributaries carried greater quantities of COC mass to the LPRSA along with the solids flow than they did after imposition of pretreatment and discharge regulations.

²⁴ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 1-2.

²⁵ N.F. Brydon, *The Passaic River: Past, Present, Future*, New Brunswick, NJ: Rutgers University Press, 1974, pp. 3-12 [MAXUS1394093-1394098]; The Center for Analysis of Public Issues, *Pollution Control on the Passaic River*, 1972, p. 4 [MAXUS006610].

²⁶ PVSC, Annual Report of the PVSC, 1978, pp. 48-50 [MAXUS0814036-0814038].

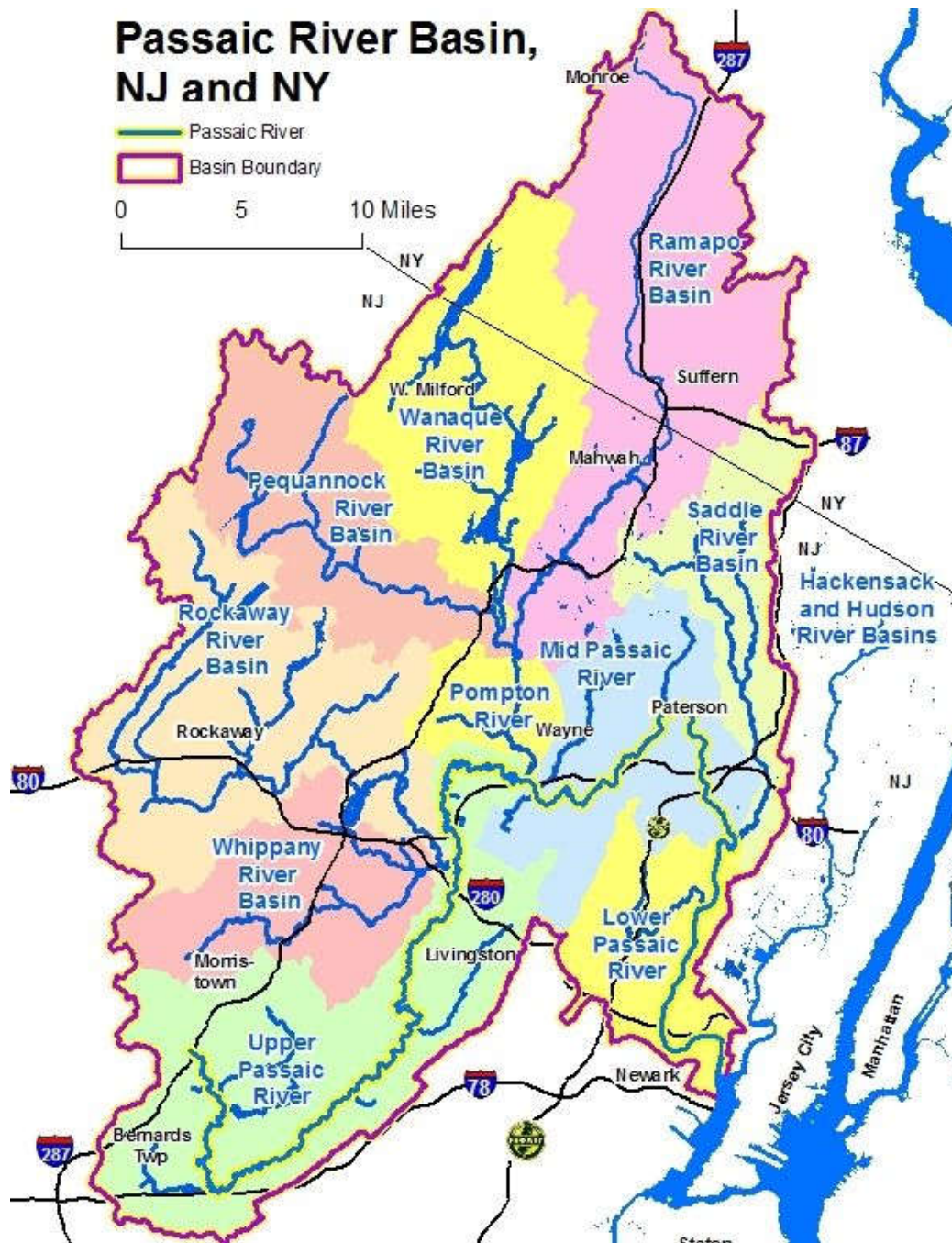
²⁷ M. Mattheiss and K. Waters, *Passaic River Environmental Plan (PREP)*, 2017, retrieved from <http://www.wrc.udel.edu/wp-content/uploads/2017/07/PREP-Passaic-R.-NJ-Presentation-2017.pdf>.

²⁸ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. ES-9 to ES-10.

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Figure 3. Passaic River Basin and Major Tributaries



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6.3 PVSC Discharges of COCs to the Passaic River

The PVSC was created by the New Jersey Legislature in 1902 with the purpose of relieving and preventing pollution in the Passaic River and its tributaries from Great Falls in Paterson to Newark Bay.²⁹ In August 1924, the PVSC initiated operations, collecting untreated sewage with a trunk line constructed along the Passaic River. This trunk line and its branch lines intercepted municipal sewer systems that previously discharged directly to the River. The interceptor system carried wastewater to the PVSC treatment plant at Newark Bay for treatment and discharge of treated effluent to New York Harbor.³⁰ Municipalities joined the PVSC over time (see Figure 4 for map),³¹ and as the municipalities grew, the flow through the PVSC system increased from 86.2 million gallons per day ("MGD") in 1924, to 201 MGD in 1950, and to approximately 250 MGD by 1976.³²

²⁹ PVSC, "Laws/Policies: Enabling Legislation," <http://www.nj.gov/pvsc/home/public/laws/> as accessed on November 23, 2015.

³⁰ Affidavit of Seymour A. Lubetkin, January 6, 1994 [846680004-846680005]; Memo from R. C Smith to PVSC, February 17, 1947, p. 2 [LPRSA0198629].

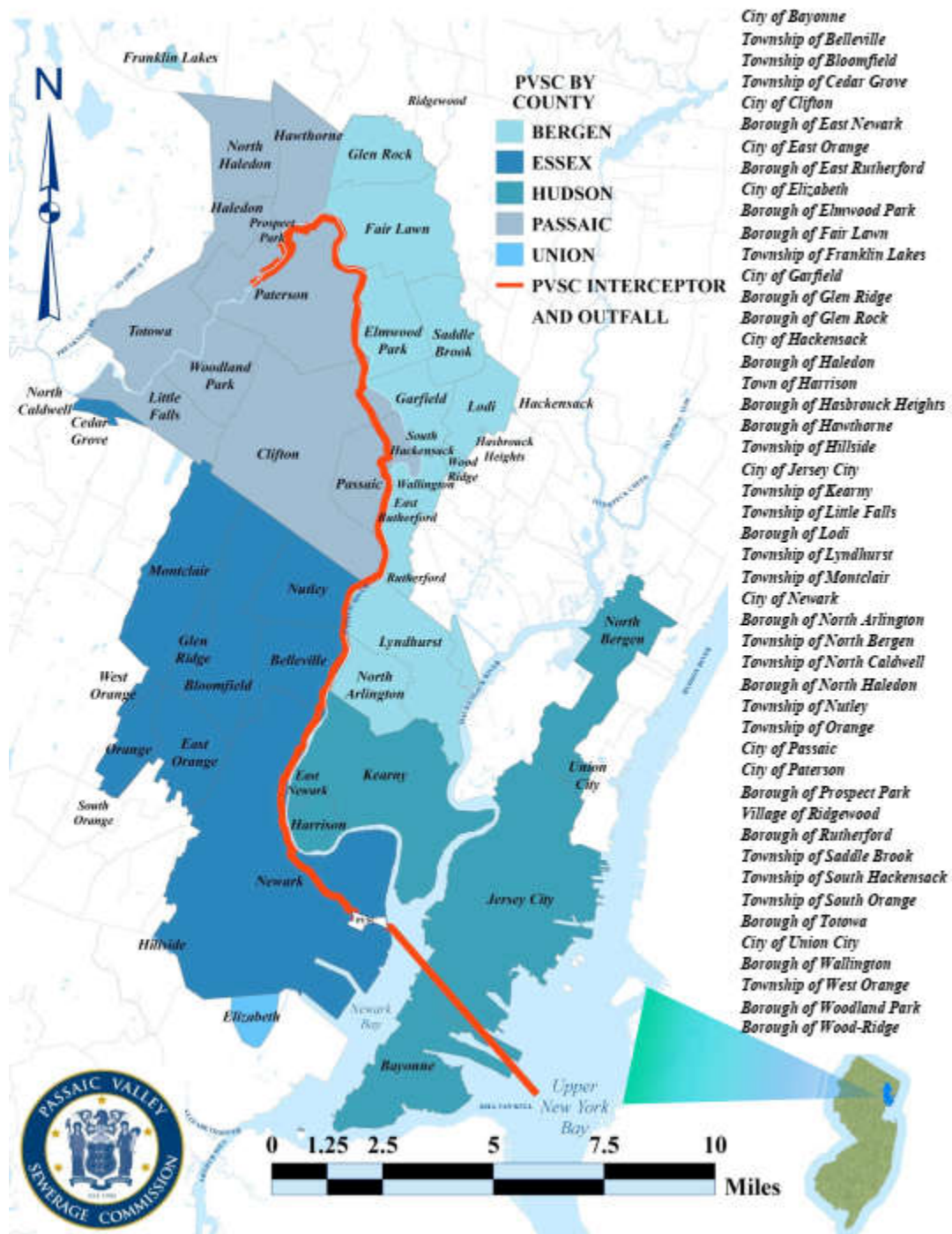
³¹ PVSC, 2013 Annual Report, retrieved from <https://www.state.nj.us/pvsc/home/forms/pdf/2013PVSCAnnualReport.pdf>.

³² PVSC, Exhibit 2: Chart Showing Ave. Daily Sewage Flow - 1924 to 1931, October 11, 1932 [LPRSA0192818]; PVSC, Average Daily Sewage Flow [LPRSA0192046]; PVSC Annual Reports, 1971 -1976 [LPRSA0005524; 5773; 5908; 6065; 6156; 6322].

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Figure 4. Municipalities in the PVSC System



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Some municipalities had combined sewer systems, in which stormwater runoff was collected in the same sewers as sanitary waste. As of 1973, a PVSC consultant reported that the municipalities of Paterson, Newark, East Newark, Harrison, Kearny, and Orange used mainly combined sewer systems.³³ The PVSC owned and operated many CSOs in these systems, which automatically discharged untreated waste to the Passaic River during periods of rain and occasionally during dry weather periods. For certain CSOs, the PVSC manually controlled overflow chamber valves. The PVSC also manually controlled additional separate sanitary/industrial sewer outlets. For decades, PVSC staff manually opened and closed these bypasses through chains linked to regulator valves or flaps, or through gates operated by hoists to control flow entering the interceptor and treatment plant during both wet and dry weather. This allowed the PVSC to "bypass" the treatment system and discharge untreated waste directly to the River.³⁴ In the mid-1980s, the PVSC installed remote controls to allow control of the bypass gates from a central control facility.³⁵

As described in detail in Exhibit 2, there is extensive documentation regarding the PVSC's discharges of untreated waste to the Passaic River. The PVSC kept "throw-out" logs to track manual bypasses to the River during rainfall and repair/maintenance events. Bypass times have also been reported more recently in NPDES reports to the NJDEP.³⁶ A 1976 report by Killam Associates for the PVSC, *Report Upon Overflow Analysis to Passaic Valley Sewerage Commissioners: Passaic River Overflows* ("1976 Killam report"), measured flows to the Passaic River from bypasses and 73 CSOs owned and operated by the PVSC.³⁷ This information, combined

³³ C. Manganaro, Report on Proposed Sewerage Facilities, Vol.1, May 1973 (revised October 1973) [LPRSA0010098].

³⁴ Affidavit of Seymour A. Lubetkin, January 6, 1994 [846680004-846680005].

³⁵ Hatch Mott MacDonald, CSO Long Term Control Plan, Cost & Performance Analysis Report, Volume 1, prepared for the PVSC, March 2007, p. 21 [MAXUS1398968].

³⁶ PVSC, NJPDES permit reports to NJDEP, CSO Regulator Events, 2008-2015, Table 1.

³⁷ Elson T. Killam Associates, Inc., Report Upon Overflow Analysis to Passaic Valley Sewerage Commissioners: Passaic River Overflows.

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with total suspended solids (“TSS”) data, provides a basis to estimate the PVSC’s sewage and solids discharges³⁸ to the Passaic River for 1924-2016, as summarized in Table 3. (See Exhibit 2 for detailed discussion of estimation methodology.)

**Table 3. Summary of Estimated PVSC Flows to the Passaic River
(1924-2016)***

	Untreated Sewage Volume	Solids Mass
PVSC Bypasses	617.1 billion gallons	1.155 billion lb (577,636 tons)
PVSC CSOs	569.9 billion gallons	0.587 billion lb (293,499 tons)
Total	1.187 trillion gallons	1.742 billion lb (871,135 tons)

* For Bypasses: Start date is August 2, 1924 and end date is September 30, 2016; For CSOs, start date is October 1, 1924 and end date is September 30, 2016.

Historical information measuring COCs in the PVSC sewage during the early decades of the PVSC operation is sparse. However, studies of influent concentrations for the PVSC and similar systems in the 1970s and 1980s make it possible to estimate PVSC COC contributions to the LPRSA as shown in Table 4 (see Exhibit 2 for detailed calculations and data sources).

³⁸ Solids flow into the river is important because, as discussed earlier, the COCs tend to bind tightly to the solids.

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Table 4. PVSC Bypasses and CSO Contaminants of Concern (lb)

COC	Estimated Bypass Mass (1924-2016)**	Estimated CSO Overflow Mass (1924-2016)**	Total Estimated PVSC Mass (1924-2016)**	EPA Estimated Mass in OU-2 Sediments
PCBs*	57,032	34,781	91,813	57,320
Mercury	242,254	205,152	447,406	92,594
Copper	1,015,838	860,258	1,876,096	4,629,708
Lead	3,804,812	3,222,088	7,026,900	7,054,792
Select PAHs (see Exhibit 2-6)	3,083,750	2,611,460	5,695,210	903,895
Total	8,203,685	6,933,739	15,137,424	

* The period for PCB mass estimation is 1930 (start of commercial use) to 1976 (ban).

** Start date is August 2, 1924; end date is September 30, 2016 (with the exception of Yantacaw and Union Outlet, where the end dates are 1975 due to lack of available detailed documentation after this date).

Note: Numbers may not add to totals due to rounding.

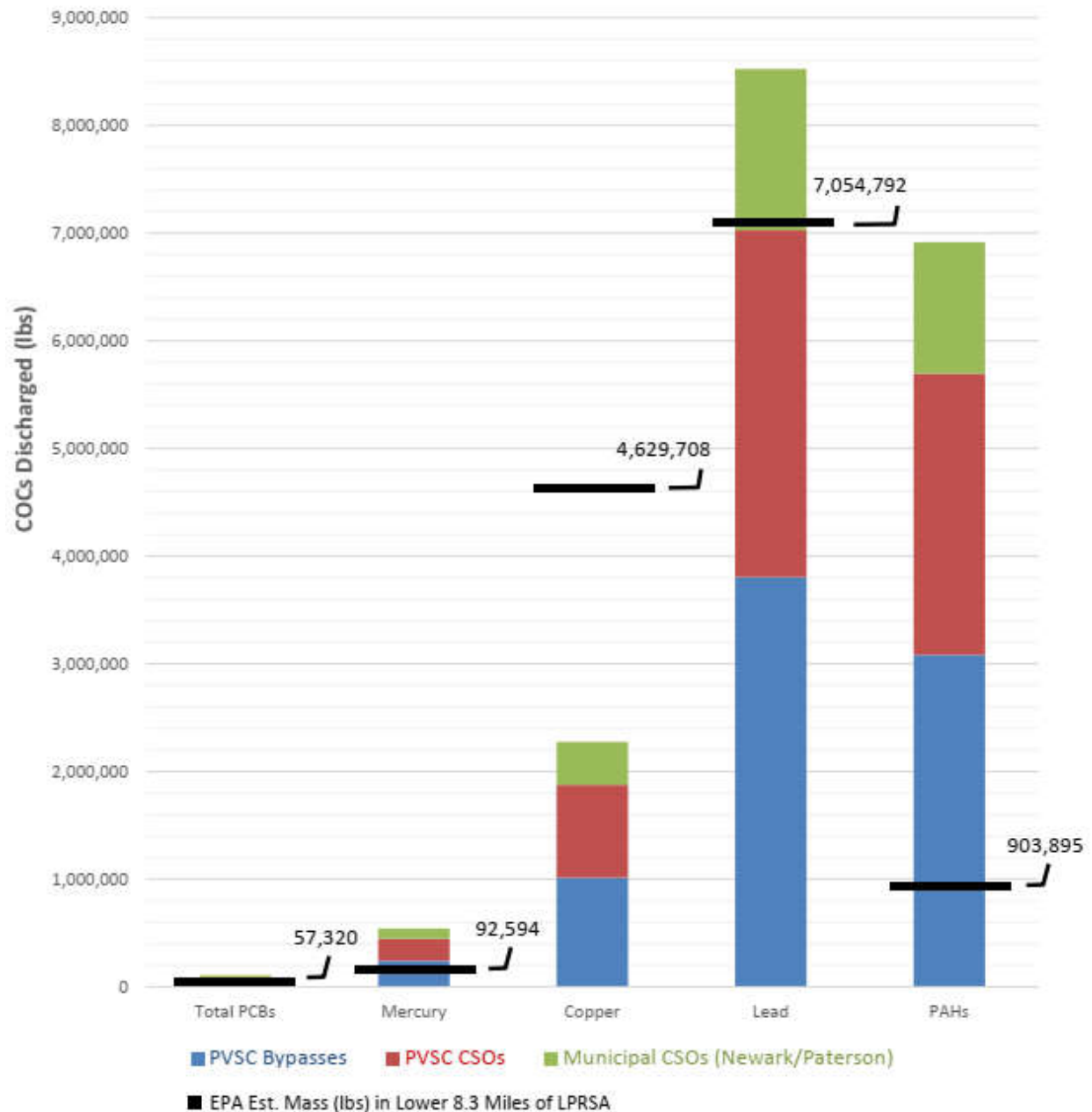
As shown in Table 4, the PVSC is estimated to have discharged over 15 million pounds of COCs to the Passaic River during the 1924-2016 time-frame. When comparing these estimates of PVSC-discharged COCs to those estimated by EPA as present in the sediments of the lower eight miles of the River, it is evident that the PVSC discharges alone could account for much of the mass of certain COCs in OU-2 (see Figure 5).

The COC mass values presented in Table 4 are likely conservatively low, as they are based on more recent concentrations that are likely low relative to earlier historical concentrations due to the imposition of industrial waste pretreatment and monitoring requirements in the 1970s. In addition, the available PCB measurements do not cover the period when PCBs were in common use, prior to being phased out by the mid-1970s.

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Figure 5. Estimated PVSC and Municipality (Newark/Paterson) Discharges of COCs (lb) Through Bypasses and CSOs (1924-2016) Relative to EPA Estimates of OU-2 Mass



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The PVSC may be the only solvent PRP left for some LPRSA COC discharge streams. For PRPs that initiated operations after 1924 (or after the sewers in their area were joined to the PVSC), discharged waste, but did not discharge directly to the River, either the PVSC or in some cases a municipal-owned system likely served as the sole conduit for their waste to the River. Therefore, for those PRPs that had operations after August 1924 but are now insolvent, the PVSC may be the last remaining viable PRP linked to the discharge of their waste into the Passaic River.

6.4 Non-PVSC Municipal Discharges of COCs to the Passaic River

This section describes the history of municipal discharges of COCs from systems that are not collected by the PVSC. This section further provides estimated COC mass contributions for Paterson (above Dundee Dam) and Newark (below Dundee Dam) to the Passaic River using the same methodology employed above for the PVSC CSOs. COCs contributed by other municipalities, as well as COCs discharged before construction of the PVSC interceptor system in 1924, have not been estimated.

The municipalities in the Passaic River basin designed, constructed, and operated their sewer systems before the PVSC initiated operation of a trunk sewer collection/treatment system in late 1924. After the PVSC started operations, some municipalities continued to operate their own sewer/treatment systems, while others operated their sewer lines until they connected to the PVSC-operated interceptor trunk line and system of bypasses and CSOs. Some municipalities, such as Paterson and Newark, also operated their own CSOs outside of the PVSC system.

Direct discharges continued from multiple municipalities for many decades after completion of the PVSC system. In a 1972 report reviewing Passaic River pollution, The Center for Analysis of Public Issues (“CAPI”) noted that polluted municipal sewer discharges into the Passaic River were identified in West Paterson, Paterson, Prospect Park, Fair Lawn, Garfield, Passaic, Clifton, Nutley,

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Belleville, Harrison, and Newark.³⁹ Citing a 1969 federal survey by the Federal Water Pollution Control Administration and N.J. Department of Health, the CAPI report identified:

- 120 municipal sewage treatment plants discharging treated and untreated waste to the Upper Passaic River above Paterson;
- Significant discharge of treated and untreated waste by Paterson above Dundee Dam; and
- 435 pipes discharging waste into the Lower Passaic River, comprised of 210 municipal outlets and 225 industrial outlets.⁴⁰

While a complete description of all municipal discharges to the Passaic River is beyond the scope of this report, details for select municipal discharges are provided below.

6.4.1 Discharges from Upper Passaic Area Municipalities (above Paterson)

CAPI found that in 1972 there were 120 sewage treatment plants discharging a total of 100 MGD of effluent, plus untreated bypassed sewage during heavy rains, to the Upper Passaic area above Paterson, concluding “State, regional and academic experts all agree that the most important sources of pollution above Little Falls are the municipal treatment plants.”⁴¹ This effluent accounted for a significant portion of the Upper Passaic River flow. For example, on October 13, 1970, the sewage effluent accounted for 40 million gallons of the total River flow of 102 million gallons at Little Falls, New Jersey. Also on that day, the PVSC tapped 65 million gallons of the Passaic River flow at Little Falls to use for potable water in Paterson, Passaic, and Clifton, further

³⁹ The Center for Analysis of Public Issues, Pollution Control on the Passaic River, 1972, pp. 27-28 [MAXUS006635-006636].

⁴⁰ The Center for Analysis of Public Issues, Pollution Control on the Passaic River, 1972, pp. 11-27 [MAXUS006617-006635].

⁴¹ The Center for Analysis of Public Issues, Pollution Control on the Passaic River, 1972, pp. 11-12 [MAXUS006617-006618].

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complicating the flow of pollution.⁴² CAPI also noted significant pollution in the Upper Passaic River area by fertilizer and automobile hydrocarbon runoff as well as oil spills, with some routed to municipal treatment plants (occasionally shutting down the treatment plant for cleanup), and some discharged directly to the River. As an example, 16 oil spills greater than 1,000 gallons were reported in the Upper Passaic area in one year; one spill of 3,000 gallons of oil in Wayne Township entered the municipal sewers, leading to pollution discharge to the Pompton River and eventually shutdown of the Wayne plant for a few days for cleanout.⁴³ Some Upper Passaic municipalities, such as Livingston Township, were noted as operating their treatment plants inefficiently, allowing “highly polluting effluent” to discharge to the River. In addition, about one-fourth of the Upper Passaic area municipal treatment plants operated in excess of design capacity, leading some to discharge untreated sewage directly to the River.⁴⁴

While CAPI identified inefficient and overloaded municipal treatment plants as contributing to pollution of the Passaic River, it also concluded that pollution prevention was not a high priority for the municipalities:

Far more serious than the problem of direct factory discharges is the relationship between industrial waste and municipal sewer operations. Most municipalities in the Upper Basin are so anxious to attract new property tax ratables that they readily offer the courted industry cheap access to the local sewer system. They repeatedly overlook the fact that their treatment plants are already overloaded or that industrial wastes might contain traces of phenol or heavy metals that the plants are not designed to handle. They are motivated entirely by what one expert calls “the municipal philosophy that residential and industrial ratables must be obtained and let the devil take the waterways” with the result being “an

⁴² The Center for Analysis of Public Issues, Pollution Control on the Passaic River, 1972, pp. 6-8 [MAXUS006612-006614].

⁴³ The Center for Analysis of Public Issues, Pollution Control on the Passaic River, 1972, pp. 10-11 [MAXUS006616-006617].

⁴⁴ The Center for Analysis of Public Issues, Pollution Control on the Passaic River, 1972, pp. 12-13 [MAXUS006618-006619].

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intolerable concentration of industrial waste discharge and severe pollution from obsolete and overloaded municipal waste treatment plants.”⁴⁵

6.4.2 Discharges from the City of Paterson CSOs

At the time of an 1897 PVSC investigation of sewage disposal to the Passaic River, Paterson had a combined sewage/stormwater system with 22 CSOs discharging to the Passaic River at an estimated total rate of 17 MGD, with an additional 9 MGD estimated as being directly discharged by Paterson manufacturers and facilities.⁴⁶ CAPI concluded in 1972 that “[t]he most notorious perpetrator of municipal bypassing today is the City of Paterson.”⁴⁷ As reported by CAPI, Paterson officials confirmed that most of its 27 miles of sewer lines were combined sanitary-storm sewers, leading to discharge of untreated waste to the Passaic River during storms. However, in addition to discharge during storms, CAPI found that discharge of untreated sewage to the River also occurred during the PVSC’s daily peak discharge hours of 10:30 a.m. to 3:30 p.m., when the main interceptor was overloaded.⁴⁸

The 1976 Killam report identified 23 CSOs owned by Paterson (in addition to the 28 active CSOs owned by the PVSC located in Paterson) that emptied into the Passaic River.⁴⁹ The Killam report points out that the Paterson combined sewer system was designed at a size below conventional design standards, accommodating only 0.5 cubic feet per second (“cfs”) per acre of drainage, versus normal sizes 2- to 3-times larger (1.0-1.5 cfs per acre of drainage). In addition, while the overall capacity of the Paterson combined sewers is 2,520 MGD, the interceptor sewer in Paterson has a capacity ranging from only 21 MGD at the upper terminus to 82 MGD at the lower

⁴⁵ The Center for Analysis of Public Issues, Pollution Control on the Passaic River, 1972, p. 15 [MAXUS006621].

⁴⁶ Report of the Passaic Valley Sewerage Commission, February 26, 1897, pp. 34-35 [MAXUS006878].

⁴⁷ The Center for Analysis of Public Issues, Pollution Control on the Passaic River, 1972, p. 24 [MAXUS006632].

⁴⁸ The Center for Analysis of Public Issues, Pollution Control on the Passaic River, 1972, p. 24 [MAXUS006632].

⁴⁹ Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, prepared for the PVSC, 1976, p. x [LPRSA0195468].

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terminus, leading to an inability to accommodate the extra flow from rainfall. As a result, rainfall in Paterson surcharges the available piping and then causes flooding and CSO discharges.⁵⁰ Killam noted that the largest Paterson-owned overflow was at 19th Avenue and Vreeland Avenue, with a capability of carrying 120-150 MGD to the Passaic River. This CSO was observed to flow during rainfalls as low as 0.04 inches/hour. Nine other Paterson overflows located in the center of the city also overflowed with low-intensity rainfalls, with an estimated overflow pipeline capacity of 150-200 MGD. Field interviews conducted during the 1976 Killam study indicated that many of the Paterson CSOs frequently discharged to the Passaic River during storms. Overall, the study estimated that the 28 Paterson-owned CSOs resulted in a discharge to the Passaic River equivalent to that discharged by the PVSC CSOs in this area, or 54 MG during the year (1974-1975) measured by Killam.⁵¹ Using the same flow/rainfall relationship and COC concentration data described above for the PVSC CSOs (and described in Exhibit 2) yields the following estimate for COCs discharged by the Paterson-owned CSOs (see Table 5).

⁵⁰ Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, prepared for the PVSC, 1976, pp. 26-28 [LPRSA0195516-0195519].

⁵¹ Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, prepared for the PVSC, 1976, pp. 36-38 [LPRSA0195526-0195528].

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Table 5. Summary of Estimated Paterson-Owned CSO Discharges to the Passaic River⁵²

Paterson-Owned CSO Discharges (1924-2016)*	
Sewage volume	4.1 billion gallons
PCBs ⁵³	247 lb
Mercury ⁵⁴	1,476 lb
Copper	6,189 lb
Lead	23,180 lb
Select PAHs ⁵⁵	26,008 lb

* Start date is October 1, 1924; end date is September 30, 2016.

6.4.3 Discharges from Cities of Newark and East Orange through Newark CSOs

The sewers in Newark were largely constructed as combined sanitary-storm sewers during the 1830 to 1930 time-frame.⁵⁶ At the time of the PVSC's 1897 investigation, the City of Newark had a combined sewage/stormwater system with outlets at Gully Road, Fourth Avenue, Mill Brook (carrying the sewage from the municipality of East Orange), Rector Street/Ballantine's Dock, City Dock, Jackson Street, and Freeman Street, plus five additional "minor" sewers that discharged to the River. Additional sewers were under consideration at the time. In addition, Newark had constructed a South Street intercepting sewer to collect sewage at this location for discharge to Newark Bay. Sewage flow from Newark and East Orange, including the South Street interceptor sewer, was estimated at 34 MGD.⁵⁷

⁵² Note that TCDD discharges via the Paterson system have not been evaluated.

⁵³ U.S. Environmental Protection Agency, PCBs Removal in Publicly-Owned Treatment Works, July 16, 1977, p. 2.

⁵⁴ Elson T. Killam Associates, Inc., Heavy Metals Source Determination, Phase II, April 1980 (Summarizing Phase I work in 1978), prepared for PVSC [LPRSA0009923 and 0009955].

⁵⁵ CFM Incorporated, Investigation of Organic Priority Pollutants in the Influent to the PVSC Treatment Plant, May 1986, Tables 2-3 (measurements taken 11/1984-1/1986).

⁵⁶ Purcell Associates, Pollution Abatement Plan: Newark, New Jersey, prepared for City of Newark, Department of Public Works, 1975, p. i [MAXUS0800485].

⁵⁷ Report of the Passaic Valley Sewerage Commission, February 26, 1897, pp. 37-38 [MAXUS006879-006880].

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In 1965/1966, Newark built the South Side Interceptor to collect sanitary waste from the Peddie, Queen, and Waverly districts and convey it to the PVSC treatment plant. Before this time, the untreated waste from these districts was discharged directly to Petty Ditch in the area of Newark Airport. However, after construction of the interceptor, untreated waste could still flow into Newark Bay. For example, when the collected waste exceeded the capacity of the South Side Interceptor, excess flow is diverted to Newark Bay via the Peripheral Ditch, which also conveys flows from Wheeler Ditch, Adams Ditch, the Newark Airport, and the City of Elizabeth. Waste could also be diverted during maintenance and repair activities, such as the repair of a faulty valve at a pumping station during April to October 1969, which led to the discharge of 30 MGD of untreated waste.⁵⁸ This flow was later measured by Killam, as discussed below.

In 1972, CAPI found that approximately half of Newark's 500 miles of sewer lines were combined sanitary-storm sewers. With more than 75 percent of the sewer system almost 100 years old and inadequately maintained, breakdowns and blockages were common, leading to discharges of untreated waste to the Passaic River. The study concluded, "When the Newark collection system is overloaded – and it is an antiquated system subject to frequent breakdowns and unable to accommodate even the slightest storm runoff – the excess finds its way into one of the 49 outfall pipes from Newark into the Passaic."⁵⁹

A 1975 study conducted for Newark notes that most of Newark's sewers were built prior to construction of the PVSC system. Once the PVSC system was built, the existing sewer lines near the PVSC trunk line were connected to it. The report states, "Little maintenance is provided for

⁵⁸ Purcell Associates, Pollution Abatement Plan: Newark, New Jersey, prepared for City of Newark, Department of Public Works, 1975, p. II-4 [MAXUS0800504]; U.S. Department of the Interior, Federal Water Pollution Control Administration, Report on the Quality of the Interstate Waters of the Lower Passaic River and Upper and Lower Bays of New York Harbor, November 1969, p. 14.

⁵⁹ The Center for Analysis of Public Issues, Pollution Control on the Passaic River, 1972, pp. 25-26 [MAXUS006633-006634].

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these facilities and at times they have been known to malfunction and discharge sanitary waste directly into the river even at low flow periods.”⁶⁰ The report notes numerous Newark outfalls to the Passaic River and Newark Bay were designed to automatically discharge untreated sewage during periods of rainfall and high flow events.⁶¹

The 1976 Killam report identified at least 14 CSOs owned by Newark (beyond the 15 owned by the PVSC) that emptied into the Passaic River or Newark Bay.⁶² The Killam report measured the South Side Interceptor CSO flows (Peddie, Queen, and Waverly districts) at approximately 2,300 MG/yr. Assuming the remaining 11 Newark-owned CSOs had average flow rates similar to PVSC-owned CSO flows, then the average annual flow per CSO is estimated at 103 MG (7,540 MG total measured annual overflow divided by 73 PVSC CSOs).⁶³ Using this average flow and the same COC concentrations described above for the PVSC CSOs yields an estimated COC discharge estimate for the 14 Newark-owned CSOs, shown in Table 6 below.

⁶⁰ Purcell Associates, Pollution Abatement Plan: Newark, New Jersey, prepared for City of Newark, Department of Public Works, 1975, p. II-3 [MAXUS0800503].

⁶¹ Purcell Associates, Pollution Abatement Plan: Newark, New Jersey, prepared for City of Newark, Department of Public Works, 1975 [MAXUS0800479-0800642]; Table II-1 [MAXUS0800].

⁶² Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, prepared for the PVSC, 1976, p. x [LPRSA0195468].

⁶³ Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, prepared for the PVSC, 1976, p. x and Table 6, p. 207 [LPRSA0195468 and LPRSA0195697].

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**Table 6. Summary of Estimated Newark-Owned CSO Discharges
to the Passaic River and Newark Bay**

	Newark-Owned CSO Discharges (1924-2016)*
Sewage volume	260.2 billion gallons
PCBs ⁶⁴	15,711 lb
Mercury ⁶⁵	93,836 lb
Copper	393,481 lb
Lead	1,473,780 lb
Select PAHs ⁶⁶ (see Exhibit 2)	1,194,479 lb

* Start date is October 1, 1924; end date is September 30, 2016.

6.5 Atmospheric Deposition and Groundwater/Leachate Flow

The Remedial Investigation notes that atmospheric deposition and groundwater/leachate are not significant current contributors to COCs in the LPRSA.⁶⁷ However, historically, before implementation of emissions controls and phase-out of lead additives in gasoline, and before implementation of groundwater monitoring and discharge permits, such contributions were likely higher.⁶⁸ (Appendix B provides additional discussion of available resources on this topic for each COC.)

⁶⁴ U.S. Environmental Protection Agency, PCBs Removal in Publicly-Owned Treatment Works, July 16, 1977, p. 2.

⁶⁵ Elson T. Killam Associates, Inc., Heavy Metals Source Determination, Phase II, April 1980 (Summarizing Phase I work in 1978), prepared for PVSC [LPRSA0009923 and 0009955].

⁶⁶ CFM Incorporated, Investigation of Organic Priority Pollutants in the Influent to the PVSC Treatment Plant, May 1986, Tables 2-3 (measurements taken 11/1984-1/1986).

⁶⁷ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 6-4.

⁶⁸ This report does not review these contributions for individual sites, some of which may have more significant flows.

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6.6 Tidal Flow from Newark Bay

In the Remedial Investigation, EPA notes that tidal flow from Newark Bay currently accounts for 14 percent of recently-deposited sediments (see Table 2).⁶⁹ The investigation estimates that tidal flow from Newark Bay accounts for 6 percent of PCBs, 8 percent of DDE (as an analog for DDx), 23 percent of copper, 14 percent of mercury, and 7 percent of lead in recently-deposited surface sediments in the LPRSA. While data are not available to document historical contributions, the data on current contributions indicate that Newark Bay also historically contributed COCs to the LPRSA.

7. COC CONTRIBUTIONS OF NON-PAPs

Understanding the extensive and lengthy industrial development along the Passaic River is critical when examining allocation issues. Although not included in the current allocation effort, the area serviced by the PVSC above Dundee Dam included numerous industrial facilities that would have contributed COCs to the Passaic River. A review of New Jersey industrial directories dating from the late-1800s to 1970s indicates the number of industrial facilities located in the PVSC service area as shown in Section 6.1, Figure 2. In total, Paterson was found to have over 5,000 industrial facilities listed over the 1874 to 2006 time-frame, with the highest number of facilities peaking at just over 1,000 in 1949. Examples of the industrial activities represented by these facilities include textile production, dyeing, metalworking, casting, printing, and the manufacture of equipment, plastics, chemicals, transformers and electrical equipment, locomotives, paints, and adhesives. As noted in Appendix B, these industries are typically associated with releases of contaminants including those identified as COCs for OU-2. **None of these facilities are included in the current allocation effort.**

⁶⁹ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, pp. ES-9 to ES-10.

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Similarly, industrial directories for Newark identified over 4,000 industrial facilities listed over the 1920 to 1974 time-frame, with the highest number of facilities found in the 1950s at over 2,700 facilities.⁷⁰ As seen in Figure 2, other municipalities connected to the PVSC below Dundee Dam showed similar development patterns, peaking at an additional 1,700 facilities in the mid-1950s, and accounting for approximately 1,300 facilities in the mid-1970s. Types of industries again range broadly, including metals smelting and refining, castings, dental laboratories, copper paints and soaps, equipment manufacture, textiles, tanners, dyeing, metalworking, tanning, printing, plastics, electrical and electronic equipment, lacquers and paints, hatters, and adhesives. Overall, approximately 6,800 industrial facilities were identified during this time frame in the area below Dundee Dam. **Of these 6,800 industrial facilities, approximately 97.6 percent are not participating parties in the allocation. Of the approximate 11,800 industrial facilities identified through industrial directories both above and below Dundee Dam, 98.6 percent are not participating in the allocation.**

In the sections below, more detailed information is provided regarding industrial sources of specific COCs, namely heavy metals (copper, mercury, and lead) and PCBs.

7.1 Sources of Metal COCs (Copper, Lead, Mercury)

The 1980 *Heavy Metals Source Determination Study* (Phase II) conducted by Killam Associates for the PVSC (the “Heavy Metals Study”) identified 260 heavy metal-contributing facilities to the PVSC system.⁷¹ The study focused on facilities that had been previously identified in the PVSC files as heavy-metal contributors, and excluded some major heavy-metals dischargers such as

⁷⁰ See industrial directories cited for Figure 2. Note that the data for the 1920s is partial information, so the figures for this time-frame are low.

⁷¹ Elson T. Killam Associates, Inc., *Heavy Metals Source Determination Study, Phase II*, prepared for PVSC, April 1980 [LPRSA0009906-0010069].

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hospitals.⁷² For these facilities, the study measured flows and metal discharges during operating hours in order to identify the sources of heavy metals observed in PVSC treatment plant influent (measured in Phase I of the study).

In the study, the PVSC system was divided into ten sub-areas (numbered 0-9 based on accessible man-holes for measuring sewage concentrations). The number of facilities identified in each sub-area is shown in Table 7 below.⁷³ Of the 260 industrial facilities in the study, 89 were located in Sub-Area 0 (Newark), followed by 71 facilities located in Sub-Area 8 (Paterson). The specific industries contributing the most metals included metal finishing and electroplating, textile manufacturers, and organic chemical manufacturers.⁷⁴

⁷² Elson T. Killam Associates, Inc., Heavy Metals Source Determination Study, Phase II, prepared for PVSC, April 1980, p. 14 [LPRSA0009931].

⁷³ Elson T. Killam Associates, Inc., Heavy Metals Source Determination Study, Phase II, prepared for PVSC, April 1980, Phase I Summary Table 1: Mass Balance Analysis, Industrial Metals, Entire Service Area, p. 21 [LPRSA0009938].

⁷⁴ Elson T. Killam Associates, Inc., Heavy Metals Source Determination Study, Phase II, prepared for PVSC, April 1980, Phase I Summary Table 1: Mass Balance Analysis, Industrial Metals, Entire Service Area, p. 14 [LPRSA0009931].

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**Table 7. COC Metals Discharges of 260 Facilities by PVSC Sub-Area
as Shown in 1980 Phase II Heavy Metals Study**

Sub-Area	Number of Facilities (%)
0: Newark (northern portion)	89 (34%)
1: Newark (southern portion)	13 (5%)
2: East Newark, Harrison, Kearny	8 (3%)
3: Belleville, Bloomfield, Orange	9 (3%)
4: Belleville, Clifton, Lyndhurst, Nutley	14 (5%)
5: Nutley	2 (1%)
6: Clifton, Lodi, Passaic, Saddle Brook	29 (11%)
7: East Rutherford, Garfield, Passaic, Wallington	15 (6%)
8: Elmwood Park, Fairlawn, Glen Rock, Haledon, Paterson	71 (27%)
9: Hawthorne	10 (4%)
Total	260 (100%)

As shown in Table 7, a substantial portion of the metals-discharging facilities are attributable to industrial facilities located above Dundee Dam in sub-areas 8-9 (e.g., Paterson). In addition, the results of the study show that significant industrial sources of metals were not included in the 260 studied facilities. For example, in sub-area 8 (Paterson), only 30.6% of industrial copper and 13.5% of industrial lead were accounted for by the study.⁷⁵

In addition to the industrial sources, the Heavy Metals Study estimated contributions for domestic and infiltration/inflow sources to the PVSC system as shown in Table 8.

⁷⁵ Elson T. Killam Associates, Inc., Heavy Metals Source Determination Study, Phase II, prepared for PVSC, April 1980, Phase I Summary Table 1: Mass Balance Analysis, Industrial Metals, Entire Service Area, p. 83 [LPRSA001000].

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Table 8. Estimated Domestic and Infiltration/Inflow Contributions of Metals to the PVSC as Shown in 1978 Phase I Heavy Metals Study⁷⁶

	Domestic Discharge (lb/day)	Infiltration/Inflow (lb/day)	Total Domestic & Infiltration/Inflow (lb/day)
Copper	120.2	30.6	150.8
Lead	69.9	63.5	133.4
Mercury	1.1	0.5	1.6

Of the total flow into the PVSC system, the study estimated domestic and infiltration/inflow contributions to be 15.1 percent for copper, 7.1 percent for lead, and 1.3 percent for mercury.⁷⁷

Of the 260 facilities accounted for in the Heavy Metals Study, 212 facilities (81.5 percent of the total) are not a part of the current allocation effort. One example of a company not participating in the allocation is Troy Chemical in Newark, even though it was found to be responsible for 327.86 lb/day mercury, or 98.25 percent of the total industrial mercury discharge into the PVSC system measured by the study.⁷⁸

In addition to the facilities identified in the Heavy Metals Study, there were numerous facilities involved in metals processing throughout the industrial history of the Passaic River area. An example of a facility that likely contributed contamination to the Passaic River is Schuyler's Copper Mines, which operated in North Arlington, New Jersey from around 1712 to 1865 and

⁷⁶ Elson T. Killam Associates, Inc., Heavy Metals Source Determination Study, Phase I, prepared for PVSC, August 15, 1978, Table 55, p. 6 [MAXUS5490327].

⁷⁷ Elson T. Killam Associates, Inc., Heavy Metals Source Determination Study, Phase I, prepared for PVSC, August 15, 1978, Table 55, p. 6 [MAXUS5490327].

⁷⁸ Elson T. Killam Associates, Inc., Heavy Metals Source Determination, Phase II, prepared for PVSC, April 1980, Phase I Summary Table 1: Mass Balance Analysis, Industrial Metals, Entire Service Area, pp. 59 and 83 [LPRSA0009976 and 001000].

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included ore crushing, separation, and washing operations. Copper milling and reduction was attempted at the site in 1900-1901, but was not successful. It is estimated that 42 shafts were installed, accompanied by drain tunnels.⁷⁹ To produce steam engines to drain the mines, a foundry and machine shop were established in Belleville on the Second River (tributary to the Passaic). This shop was turned into the Hendricks Copper Rolling Mill to process copper ore from the Schuyler's mines to produce copper bolts and wire. The copper mill operated until 1928.⁸⁰ Copper mines also operated in East Orange, Orange, and Glen Ridge. One was located on the Second River (tributary to the Passaic River), one on Wigwam Brook (tributary to Second River), and another on Toney's Brook (a tributary to the Passaic River).

7.2 Sources of PCBs

There are numerous companies that likely contributed PCBs to the LPRSA that are not PAPs. To identify potential contributors of this COC, facility lists were collected from the following information sources:

- PVSC Significant Industrial User list⁸¹
- PCB sales data⁸²
- EDR data identifying PCB contamination/inspections/violations in the Passaic River area⁸³

⁷⁹ G.F. Black, Newark Mineralogical Society, "The Belleville Copper-Mine," 1922.

⁸⁰ H.P. Woodward, New Jersey Department of Conservation and Development, Copper Mines and Mining in New Jersey, 1944.

⁸¹ Letter from W. Hengemihle, FTI, to S. Flanagan, EPA, regarding PVSC Industrial Users List, Lower Passaic River Study Area, February 10, 2017.

⁸² Monsanto PCB Sales Summaries.

⁸³ EDR DataMap Environmental Atlas, Environmental Data Resources Inc., June 18, 2015.

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For the facilities listed in these sources, I evaluated information regarding the types of products manufactured to determine which facilities were likely users of PCBs. The results are provided in Exhibit 3, **showing over 450 non-PAP parties that are likely to have used PCBs in the Passaic River area.** Due to the locations of these facilities, they could have discharged waste streams either through the PVSC sewer system (with its bypasses and CSO discharges to the River), to their municipal sewers (with their own CSO discharges to the River), and/or directly to the River or its tributaries. Appendix C provides more detailed examples of potential PCB-discharging facilities that are not a part of this allocation effort.

8. CONCLUSIONS

Based on my review of the extensive information that is available about sources of contamination to the LPRSA, it is clear that the historical sources of COCs to the LPRSA are very broad. These historical sources include thousands of residential, commercial, and industrial sources from both above and below Dundee Dam that:

- Discharged directly to the Passaic River
- Discharged to the extensive network of tributaries to the Passaic River
- Discharged to the Passaic River by PVSC bypasses and CSOs
- Discharged to the Passaic River through municipality direct discharges
- Flowed back up the River via twice daily tidal flows from Newark Bay
- Discharged indirectly through aerial deposition, groundwater/leachate discharge, and stormwater runoff.

Considering only industrial sources, data show that there were thousands of industrial facilities located on the Passaic River. Of these, over 98 percent are not participating in the current allocation effort. When examining historical PVSC research on heavy metals, non-PAPs comprise

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81.5 percent of the parties identified as dischargers of heavy metals to the PVSC sewage in the late 1970s. Finally, when examining several sources of likely PCB users in the PVSC service area, over 450 facilities were identified that are non-PAPs.

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EXHIBIT 1

RESUME OF GAYLE SCHLEA KOCH

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GAYLE SCHLEA KOCH

Principal

Ms. Gayle Schlea Koch has over 35 years of consulting experience focused largely on environmental, product liability, technology, and insurance related issues. She has worked broadly in the environmental/mass tort area applying her engineering and business background to address the complex technical and economic issues that arise. She has substantial experience in the estimation of environmental and product liabilities in connection with settlements, insurance claims, penalties, acquisitions and divestitures, bankruptcies, real estate transfers, litigation, and strategic planning.

Ms. Koch has worked extensively in the evaluation of environmental damages, estimation of asbestos and other mass tort liabilities, allocation and recovery of cleanup costs, evaluation of potential insurance recovery, and assessment of the impact of environmental regulations. She has served as an expert on cases involving liability estimation, allocation, cost recovery and NCP (National Contingency Plan) consistency, insurance recovery valuation, disclosure, economic damages, and ability to pay. She has also worked on the evaluation of new technologies and new market opportunities often created by new environmental regulations or changing energy markets.

Examples of projects that are particularly relevant to the mass balance and allocation issues in this matter include:

- Currently working on complex allocation issues with regards to a metal production facility that operated over many decades
- Conducted a litigation risk analysis for multiple PRPs at a complex river system with PCB contamination, looking at possible regulatory action, cost, and allocation scenarios
- Critiqued an allocation prepared for a vast Superfund mining site involving multiple tributaries to a lake system
- Developed an allocation for a Superfund site involving multiple parties/operations over a lengthy period of time, requiring the re-creation of past industrial processes and waste disposal practices, including those from the manufacture of DDT
- Conducted a litigation risk analysis related to cost and allocation scenarios at a harbor site involving PCBs and metals in sediments
- As part of an insurance recovery valuation, researched allocation issues at approximately 350 sites, many with PCB and metals contamination
- Prepared an allocation related to contiguous sites with multiple oil-related activities that changed over time
- Examined allocation and NCP consistency issues as part of a cost recovery matter at a harbor with contaminated sediments
- Critiqued a proposed allocation for a multi-party landfill, examining contaminants of concern versus the composition of various waste streams
- Conducted a litigation risk analysis for an oil tanker company, including allocation, regulatory, and cost recovery issues

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Ms. Koch has served as a technical contact for ASTM International (formerly the American Society of Testing and Materials) standards on environmental cost estimation, environmental disclosure, and climate change disclosure. She has participated in meetings with Commissioners of the U.S. Securities and Exchange Commission (SEC) concerning environmental cost estimation and disclosure issues. In addition, Ms. Koch served on the Standards Council of the Sustainability Accounting Standards Board (SASB).

Before co-founding Axlor Consulting, Ms. Koch led the Environmental/Mass Tort practice at The Brattle Group and worked as a consultant with Putnam, Hayes & Bartlett where she focused on environmental and toxic tort liability assessment and insurance issues. Ms. Koch also served as a manager with RCG/Hagler, Bailly & Company, where she focused on the market and economic analysis of industrial process and energy technology markets and on the management of energy and environmental R&D activities. Earlier, Ms. Koch served as a research assistant for the Sloan School of Management at the Massachusetts Institute of Technology and in several positions with E.I. du Pont de Nemours & Company.

EDUCATION

Ms. Koch received a B.S. in Chemical Engineering and a B.S. in Humanities and Engineering (in the Science, Technology and Society Program) from the Massachusetts Institute of Technology, and an M.S. in Management Science (concentrations in applied economics, corporate strategy, and management of technological innovation) from the Sloan School of Management, M.I.T.

PROFESSIONAL ACTIVITIES

- ◆ ASTM International, Committee E50 on Environmental Assessment, Risk Management and Corrective Action
- ◆ ASTM International (Award of Appreciation, 2010; Distinguished Service Industry Leadership Award, 2017)

PUBLICATIONS AND PRESENTATIONS (LAST 10 YEARS)

"Next Generation ASTM Standards for Environmental Liability Estimation and Disclosure," presented at the ASTM International Workshop, Toronto, Canada, April 5, 2017; presented to the American Bar Association, April 12, 2017.

"Tips for Chemical Engineers from Over 25 Years in Litigation," presented at the 2012 American Institute of Chemical Engineers (AIChE) Spring Meeting, Houston, Texas, April 2, 2012.

"Climate Change: Disclosure Guidelines," presented at the American Bar Association's 40th Annual Conference on Environmental Law, Salt Lake City, Utah, March 19, 2011.

GAYLE SCHLEA KOCH**3**

“Guidelines & Implementation for Climate Change Disclosure,” presented at Update on SEC Disclosure and Financial Reporting for Environmental Obligations sponsored by BNA and Sidley Austin LLP, January 20, 2011.

“Climate Change Financial Disclosure: An Update,” presented to the National Asian Pacific American Bar Association (NAPABA) Sustainability and Climate Change Committee, October 20, 2010.

“ASTM International’s Standard E2178-10: Financial Disclosure Attributed to Climate Change,” presented at the American Bar Association Section of Environment, Energy, and Resources Quick Teleconference Series, Recent Developments in Climate Change Disclosure: U.S. and Canadian Perspectives, April 13, 2010.

TESTIMONY (LAST 4 YEARS)

Expert Report in the Matter of ASARCO LLC v. Union Pacific Railroad Company et al., Civil Action No. 2:12-cv-00283-EJL, U.S. District Court for the District of Idaho, June 12, 2015. Deposition taken July 29, 2015. Declaration filed November 9, 2015. Supplemental Expert Report, September 16, 2017. Court testimony, November 14-15, 2017.

Declaration in the Matter of *Vertellus Specialties, Inc., et al.*, in the U.S. Bankruptcy Court for the District of Delaware, Case No. 16-11290-, September 2, 2016.

Rebuttal Report in the Matter of *City of Los Angeles v. BAE Systems San Diego Ship Repair Inc.*, U.S. District Court for the Central District of California, Case No. 13-CV-8810, March 8, 2016.

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EXHIBIT 2

PVSC DISCHARGES TO THE PASSAIC RIVER

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PASSAIC VALLEY SEWER COMMISSION (PVSC)

DISCHARGES TO THE PASSAIC RIVER

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PURPOSE

At the request of counsel on behalf of the Lower Passaic River Study Area ("LPRSA") Small Parties Group ("SPG"), I conducted research on activities of the Passaic Valley Sewer Commission ("PVSC") related to disposal of untreated waste into the Passaic River for the purpose of calculating estimated PVSC volumetric and mass flows of contaminants of concern ("COCs") related to PVSC discharges. These discharges generally fall into three categories: (1) discharge of untreated industrial and domestic waste to the river due to system breakdown, maintenance, and repair activities, (2) PVSC-controlled discharges of untreated waste to the river during high flow events such as rain storms and snow melts, and (3) automatic discharges of untreated waste from combined sewer overflow ("CSO") points. This report is based on the documentation available to date. I will continue to review information as it is made available to me. The opinions offered herein are offered to a reasonable degree of professional certainty.

SUMMARY

Table 2-1 below presents estimated bypass and CSO overflow amounts based on flow and mass information measured by a PVSC contractor in 1974-1975, contaminant measurements taken during 1977-1986 for the COCs identified in EPA's Record of Decision ("ROD") for the lower portion of the Passaic River,¹ and documented PVSC bypasses of untreated waste to the Passaic River during 1950-1975 and 2005-2014 extrapolated to estimate for bypasses during the 1924-2016 period. Note that because they are based on measurements made after industrial waste pretreatment was starting in the late 1970s and after the phase-out of PCB sales in the mid-1970s, the COC mass estimates presented in Table 2-1 are conservatively low.

¹ U.S. Environmental Protection Agency, Region II, Record of Decision: Lower 8.3 Miles of the Lower Passaic River, Part of the Diamond Alkali Superfund Site, March 3, 2016, pp. 14-16.

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Table 2-1. Summary of Estimated PVSC Flows to the Passaic River

	Estimated Bypass Volume and Mass (1924-2016)*	Estimated CSO Automatic Overflows (1924-2016)**	Total (1924-2016)
Sewage volume	617.1 billion gallons	569.9 billion gallons	1.187 trillion gallons
Solids Mass	1.155 billion lb (577,636 tons)	0.587 billion lb (293,499 tons)	1.742 billion lb (871,135 tons)
PCBs	57,032 lb	34,781 lb	91,813 lb
Mercury	242,254 lb	205,152 lb	447,406 lb
Copper	1,015,838 lb	860,258 lb	1,876,096 lb
Lead	3,804,812 lb	3,222,088 lb	7,026,900 lb
PAHs (see Exhibit 2-6 for PAH list)	3,083,750 lb	2,611,460 lb	5,695,210 lb

* Start date is August 2, 1924; end date is September 30, 2016.

** Start date is October 1, 1924; end date is September 30, 2016.

Note: Numbers may not add to totals due to rounding.

PVSC SYSTEM

The PVSC was created by the New Jersey Legislature in 1902 for the purpose of relieving and preventing pollution in the Passaic River and its tributaries between Great Falls in Paterson, New Jersey, and Newark Bay.² In August 1924, the PVSC began collecting untreated sewage with a trunk line constructed along the Passaic River. This trunk line intersected municipal lines which previously discharged directly to the river. Collected wastewater was then pumped to the PVSC treatment plant at Newark Bay.³

Municipalities joined the PVSC over time as shown in Exhibit 2-1. As more municipalities joined and as their population grew, the flow through the PVSC treatment system expanded from 86.2

² PVSC, "Laws/Policies: Enabling Legislation," <http://www.nj.gov/pvsc/home/public/laws/> as accessed on November 23, 2015.

³ Affidavit of Seymour A. Lubetkin, January 6, 1994 [846680004-846680005]; Memo from R. C Smith to PVSC, February 17, 1947, p.2 [LPRSA0198629].

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million gallons per day ("MGD") in 1924, to 201 MGD in 1950, and to approximately 250 MGD by 1976.⁴

PVSC CSOs

Some municipalities maintained combined sewer systems, in which stormwater runoff was collected in the same sewers as sanitary waste. As of 1973, a PVSC consultant reported that the municipalities of Paterson, Newark, East Newark, Harrison, Kearny, and Orange used mainly combined sewer systems.⁵ These combined systems resulted in combined sewer overflows ("CSOs") of untreated waste to the Passaic River primarily during periods of rain and also occasionally during dry weather periods if the high waste levels overflowed a weir or stop logs in the overflow chambers.

A 1976 report by Killam Associates for the PVSC, *Report Upon Overflow Analysis to Passaic Valley Sewerage Commissioners: Passaic River Overflows* ("1976 Killam report"), measured one year of volumetric flows and total suspended solids ("TSS") flows to the Passaic River from 73 CSOs (located both above and below Dundee Dam) owned and operated by the PVSC.⁶ Using the measured CSO flows and accompanying rainfall data, Anchor QEA correlated CSO flows to the Passaic River to rainfall amounts.⁷ Anchor QEA applied this correlation to historical rainfall data to derive an estimated PVSC CSO flow of 569.9 billion gallons of untreated sewage into the Passaic River during 1924 to 2016. Applying this estimated flow to TSS data in the 1976 Killam

⁴ PVSC, Exhibit 2: Chart Showing Ave. Daily Sewage Flow - 1924 to 1931, October 11, 1932 [LPRSA0192818]; PVSC, Average Daily Sewage Flow [LPRSA0192046]; PVSC Annual Reports, 1971 -1976 [LPRSA0005524; 5773; 5908; 6065; 6156; 6322].

⁵ C. Manganaro, Report on Proposed Sewerage Facilities, Vol.1, May 1973 (revised October 1973) [LPRSA0010098].

⁶ Elson T. Killam Associates, Inc., Report Upon Overflow Analysis to Passaic Valley Sewerage Commissioners: Passaic River Overflows. Note this report measured outflows during a "water year," defined as October 1-September 30. All Anchor QEA data reflect use of "water years."

⁷ Anchor QEA, PVSC CSO overflow and mass discharge estimates, 2017. (See Exhibit 2-8.)

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report, Anchor QEA estimated that the CSOs discharged 587 million lb (293,499 tons) of solids mass to the river during this time-frame.

PVSC BYPASSES

While many PVSC CSOs discharged combined overflows to the river automatically as discussed above, some overflow chamber valves and additional separate sanitary/industrial sewer outlets were controlled manually by the PVSC. For decades, PVSC staff manually opened and closed these bypasses through chains linked to regulator valves or flaps, or through gates operated by hoists. This allowed the PVSC to choose to bypass the treatment system and discharge untreated waste directly to the river.⁸ In the mid-1980s, the PVSC installed remote controls to allow control of the bypass gates from a central control facility.⁹

Seymour (Sy) Lubetkin, PVSC Assistant Chief Engineer (1950 to 1954) and Chief Engineer (1954 to 1978), who directed PVSC Bypass Crew operations (a 24-hour/7-day per week work crew), stated:

The PVSC bypassed waste to the River in the following instances:

- a. when it rained and the volume of flow in the system threatened to exceed capacity;*
- b. when it was necessary to reduce the flow in order to repair sewer lines;*
- c. when discharges occurred accidentally, as when the flap valves closed because the chain had broken or come unattached; and*
- d. when a breakdown occurred at the pumping station or treatment plant and it was necessary to limit flow for repairs or to prevent further damage during repairs.¹⁰*

⁸ Affidavit of Seymour A. Lubetkin, January 6, 1994 [846680004-846680005].

⁹ Hatch Mott MacDonald, CSO Long Term Control Plan, Cost & Performance Analysis Report, Volume 1, prepared for the PVSC, March 2007, p. 21 [MAXUS1398968].

¹⁰ Affidavit of Seymour A. Lubetkin, January 6, 1994 [846680003-846680007].

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According to Mr. Lubetkin, in cases of rain, the Second River Meeting Sewer (Union Outlet) was “easy to bypass because the gates were in the line maintenance yard at Second River owned by the PVSC so they were readily accessible to PVSC personnel.”¹¹ If extensive bypassing was needed, the “last resort” was the Yantacaw Bypass. Bypassing this part of the system, which included all waste from the northern portion of the interceptor, was referred to as “having to throw Yantacaw.”¹²

The major bypasses discharged untreated waste from multiple municipalities. For example, when the Yantacaw Bypass was opened, all wastes upstream of the Third River were sent untreated to the Passaic River, including waste from the municipalities of Paterson, Haledon, Prospect Park, Hawthorne, Fair Lawn, Elmwood Park, Garfield, Clifton, Lodi, Passaic, Wallington, and East Rutherford.¹³ When the Union Outlet (Second River Bypass) was opened, the entire flow of untreated sanitary, domestic, and industrial waste from Montclair, Orange, Glen Ridge, Bloomfield, and East Orange was discharged directly to the Passaic River.¹⁴ Exhibit 2-2 shows a summary of the PVSC bypasses investigated in this report and the areas served by the sewers connected to each bypass.¹⁵ A total of approximately 39,605 acres was served by the sewers connected to these PVSC bypasses. Exhibit 2-3 provides maps prepared for the PVSC that depict the location of the bypasses along the Passaic River, as well as maps depicting the sewer areas connected to each Newark bypass.¹⁶

¹¹ *Ibid* [846680007].

¹² *Ibid* [846680007].

¹³ Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, prepared for the PVSC, 1976 [LPRSA0195524; 0195578].

¹⁴ Elson T. Killam Associates, Inc., Report Upon Overflow Analysis: Second River Union Outlet, Newark, prepared for the PVSC, 1976 [LPRSA0232948].

¹⁵ Note that there is some documentation of PVSC bypasses in Paterson. Since the available documentation covers only occasional PVSC bypasses in this area, they are not included in this report.

¹⁶ Elson T. Killam Associates, Inc., Report Upon Overflow Analysis to Passaic Valley Sewerage Commissioners: Passaic River Overflows.

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While complete documentation regarding PVSC bypasses has not been produced to date, there is extensive documentation regarding the PVSC's discharges to the Passaic River during select time periods. For example, detailed time log documentation was provided by Mr. Lubetkin for much of the period from October 1950 through December 1962. The time logs (referred to as "throw-out logs" because they depicted waste being thrown out of the PVSC system and into the river) identify the dates and times that the PVSC manually opened and closed the bypasses during rainfall and repair/maintenance events. In addition, PVSC contractor Elson T. Killam Associates, Inc. documented bypasses observed during portions of 1974 to 1975, as well as measurements of the volume of bypassed flows and total suspended solids ("TSS") concentrations.¹⁷ The PVSC also summarized its recent annual Newark bypasses to the Passaic River in NPDES reports; to date NJDEP has made available reports for the years 2005-2014.¹⁸

The documented PVSC bypasses discussed above are summarized in Exhibit 2-4 for each bypass starting in October 1950. This exhibit shows the start and end times for PVSC bypasses to the Passaic River and the calculated total bypass time (in hours and minutes). For the 1974-1975 time-frame, Exhibit 2-4 also summarizes PVSC contractor measurements of bypass times, average bypass flow rates, and average storm TSS values. During the 2005-2014 time-frame, PVSC reports indicate the number of Newark bypasses and the annual elapsed time for each bypass location. Using the measured flow and TSS data from 1974-1975 for each PVSC bypass location shown in Exhibit 2-4, total bypassed volume (in million gallons/hour or "MG/hr") is calculated by summing the total measured overflow volume (elapsed time for each specific bypass event multiplied by the average flow rate for that specific bypass event). This total bypassed volume is then divided by the total bypass time to derive a bypassed volume rate (MG/hr).¹⁹ In addition, for each bypass location in Exhibit 2-4, bypassed mass (in pounds or "lb")

¹⁷ *Ibid.* Note that in this report, bypasses are indicated as "regulator closed" events, in which the regulator valve allowing waste to be transported to the PVSC Treatment Plant is closed.

¹⁸ PVSC, NJPDES permit reports to NJDEP, CSO Regulator Events, 2008-2015, Table 1.

¹⁹ During the 1974-1975 Killam research period, some Newark bypass regulators were inoperable or unused, preventing measurement of bypass flow. In these instances, average measured overflow data are used to calculate flow volumes as noted in Exhibit 2-4. These overflow measurements should be conservatively low compared to the flow that would be experienced when waste was bypassed. Likewise, the Yantacaw Bypass was

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is calculated by multiplying average storm TSS measurements²⁰ by the bypassed volume. The total of bypassed mass is then divided by total bypass time to derive a mass bypass rate (lb/hr) for each location. These calculated bypass volume and mass rates are shown in Exhibit 2-4 for each bypass location.

Table 2-2 below summarizes the documented PVSC bypass times for each bypass location, using the available documentation for the 1950-1962 and 1974-1975 time periods (see Exhibit 2-4 for details). For each bypass location, average annual bypass times were calculated for 1952 to 1962, the period when there are few missing bypass logs. Bypass times for dates with missing documentation during the 1924-1974 period (see highlighted dates in Exhibit 2-4) were then estimated using the 1952-1962 average annual bypass times, adjusted downward during 1924-1950 to account for lower average daily flow rates in the PVSC system as shown in Exhibit 2-5.²¹ Bypass times for dates with missing documentation during the 1975-2016 period were estimated using the more recent 2005-2014 average annual bypass times.²² The resulting total estimated bypass times for 1924-2016 (which include the documented bypasses during this period) are shown in Table 2-2.

not opened during the Killam study period. However, Killam provided a measurement for the Yantacaw average flow during wet weather, which is used in this analysis. Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, prepared for PVSC, 1976, p. 106 [LPRSA0195596].

²⁰ The TSS measured during storm events was used for this analysis, since the majority of bypasses occurred during storms. Also, it is noted that TSS measurements may not measure all of the mass (such as floating solids or sludge). Therefore, this report may underestimate solids mass releases.

²¹ For example, the 1925 average daily flow in the PVSC system was 100.12 MGD versus 201.02 MGD in 1950, resulting in an index adjustment of 100.12/201.02 or 0.498 for 1925 estimates. While it is possible that the 1924-1950 bypass times are similar to the 1952-1962 annual average, the lower system throughput could indicate lower bypass times and in particular, lower bypass volumes. As a conservative estimate, the times and resulting volume estimates have been adjusted downward.

²² An EPA survey of Superfund allocators indicates that such extrapolation is often used to fill in volumetric data for non-recorded periods where waste production/disposal records are absent. In particular, existing waste production/disposal data combined with years of operation may be used to fill in missing data. In addition, typical manufacturing/production line process discharges and spills may be used to estimate disposal volumes when volumetric data are unavailable. Source: Office of Site Remediation Enforcement, EPA, *Developing Allocations Among Potentially Responsible Parties for the Costs of Superfund Site Cleanups*, October 1994, pp. 4-6.

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Table 2-2. Bypass Times (hours)

Bypass	Documented Bypasses (1950-1962, 1974-1975, 2005-2014)	Total Estimated Bypasses (1924-2016)**
Yantacaw*	2,486	9,354
Union Outlet*	14,289	53,940
Verona Avenue	12,401	48,626
Herbert Place	17,804	68,521
4th Avenue	18,053	69,488
Clay Street	19,128	73,007
Rector Street	18,216	70,165
Saybrook Place	17,310	71,465
City Dock	13,075	47,656
Jackson Street	17,936	68,922
Polk Street	18,061	69,410
Freeman Street	18,180	69,874

* Projections for Yantacaw and Union Outlet bypasses are not included after 1975 due to lack of detailed bypass documentation after this date. As described in the text, anecdotal information shows that the PVSC continued to open these bypasses after 1975, making the estimates conservatively low.

** Includes documented bypasses. Start date is August 2, 1924; end date is September 30, 2016, with the exception of Yantacaw and Union Outlet where the end date is 1975 due to lack of available detailed documentation after that date.

There is evidence showing that the PVSC bypassed untreated waste to the Passaic River in time periods extending back to early operations. For example, a PVSC document summarizing flows during November 17-24, 1924 indicates that during the week, the PVSC bypassed 18.12 MGD to the Passaic River at Yantacaw, equal to 47.4% of the total Yantacaw flow for that week.²³ During the week of November 24-December 1, 1924, an additional 14.16 MGD was bypassed at Yantacaw to the Passaic River, equivalent to 46.7% of the Yantacaw flow for that week. The Union Outlet was also bypassed for several days during this week.²⁴

²³ PVSC, Table No.4, Flow of Towns in Order of their Interception, Week of Nov. 17-24 [LPRSA0194301].

²⁴ PVSC, Table IV, Flow of Towns in the order of their Interception, November 24-December 1, 1924 [LPRSA0194291]; Table II, Weekly Record of Venturi Meters, November 26-December 3, 1924 [LPRSA0194288].

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Bypasses later in time are also indicated. For example, a PVSC contractor reported that the PVSC bypassed waste to the Passaic River for several months during 1969 while pumps were being repaired.²⁵ The PVSC also reported that on April 16, 1973, the bypasses were opened at Yantacaw and Newark to allow for inspection of the trunk sewer line, with additional bypassing for inspections on October 14, 1973. Based on this inspection, the PVSC bypassed sewage to the Passaic River for the month of March through April 4, 1974, to allow for internal sewer repairs.²⁶ In June 1979, equipment repairs and breakdowns let the PVSC to bypass untreated waste to the Passaic River at Union Outlet, Herbert Place, 4th Avenue, Clay Street, Rector Street, Saybrook Place, Freeman Street, Polk Street, and Jackson Street (Newark).²⁷ Following primary treatment, all PVSC waste was bypassed at a PVSC outlet at Newark Bay (outlet 002) from November 9, 1979 to August 14, 1980.²⁸ The PVSC also bypassed waste from twenty overflow points to the Passaic River for 21 days in 1980 due to a pipeline break in Paterson. In June 1984, the PVSC bypassed approximately 12 MG of chlorinated, but otherwise untreated sewage to the Passaic River at the Wallington pumping station (including waste from Saddle Brook, Lodi, Garfield, and Wallington) due to equipment work.²⁹ Bypasses at Yantacaw (Third River), Union Outlet (Second River), and Clay Street (Newark) occurred during June 8-9, 1986 to allow for PVSC inspections of the main interceptor.³⁰ Bypasses occurred during April 17-18, 1988 at eight locations (including Verona Avenue, Herbert Place, 4th Avenue, Rector Place, and Saybrook Place in Newark as approved by NJDEP) to allow for attempted inspection of the main interceptor; toxic vapors in the sewer

²⁵ Charles A. Manganaro, Report on Proposed Sewerage Facilities, Volume 1, May 1973 (Revised October 1973), p. V-10 [LPRSA0233051].

²⁶ PVSC, Special Report #3 (from March 1974 Report): Crack Repair Under McCarter Highway [LPRSA0006004-0006009].

²⁷ Letter from E.J. Moller, PVSC to EPA, June 18, 1979.

²⁸ PVSC memo regarding discharge from PVSC to Newark Bay, July 16, 1980; NJDEP press release, August 22, 1980.

²⁹ R. Leith, "Effect of Sewage Flow on River Life Being Monitored," *The Record*, June 17, 1984; Letter from D.C. Hofman, NJDEP to R.D. Ricci, PVSC, May 13, 1980.

³⁰ Letter from J.A. Lawrence, PVSC to A. Schiffman, NJDEP, June 11, 1986. (Note that bypassed waste was disinfected with hypochlorite solution before discharge to the Passaic River.)

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prevented workers from completing the inspection.³¹ The Herbert Place (Newark) bypass discharged untreated sewage to the Passaic River on January 5, 1989 due to a regulator control malfunction.³²

As indicated in the detailed bypass logs through 1962, in general the Union Outlet was used first and most frequently, followed by the Newark bypasses.³³ Yantacaw tended to be the last bypass used. As a percentage of total time, on average Union Outlet was bypassed to the Passaic River approximately 12 percent of the time, whereas Yantacaw was bypassed approximately 2 percent of the time. Bypass information for Union Outlet and Yantacaw for the 2005-2014 time-frame has not been made available; during this time the Newark bypasses were used relatively consistently and up to 62 times per year.

Table 2-3 below shows estimated bypass volume and bypass rates using the bypass flow information collected by PVSC's contractor during 1974-1975. The total bypassed volume estimate was calculated by multiplying total bypassed time by average bypass volume flow rate.³⁴ The estimated volume bypassed by the PVSC during 1924-2016 is approximately 617.1 billion gallons. This volume is similar in magnitude to Anchor QEA's estimated CSO automatic overflow volume of 569.9 billion gallons,³⁵ for a total PVSC system flow to the Passaic River of 1.187 trillion gallons of sewage.

³¹ Letter from L.T. Cattaneo, NJDEP to S. Lipke, PVSC, April 15, 1988 and letter from S. Lipke, PVSC to B. Zimmer, NJDEP, April 19, 1988.

³² Letter from P. Habrukowich, PVSC to P. Lynch, NJDEP, January 6, 1988.

³³ While PVSC Chief Engineer Sy Lubetkin indicated in his 1994 affidavit that the Newark bypasses were usually employed first, followed by Union Outlet, the detailed bypass logs produced by Mr. Lubetkin show that Union Outlet was usually opened first, and often in concert with the Newark bypasses. As pointed out by Mr. Lubetkin, the Union Outlet bypass was located in the PVSC line maintenance yard, so it was nearby and easy to access by the bypass crew. Affidavit of Seymour A. Lubetkin, January 6, 1994 [846680003-846680007].

³⁴ Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976. Note that measured stormy weather flow rates and TSS data are used from this report because a majority of the PVSC's documented bypasses cite stormy weather at the time of the bypass.

³⁵ Anchor QEA, PVSC CSO overflow and mass discharge estimates, 2017. (See Exhibit 2-8.)

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Table 2-3. Bypassed Volume

Bypass	Estimated Bypass Volume Rate (MG/hr)	Estimated Bypassed Volume (MG) (1924-2016)*
Yantacaw*	5.083	47,548
Union Outlet*	1.012	54,608
Verona Avenue	0.292	14,208
Herbert Place	0.387	26,543
4th Avenue	0.275	19,078
Clay Street	2.375	173,360
Rector Street	0.356	24,980
Saybrook Place	0.773	55,215
City Dock	1.771	84,391
Jackson Street	0.692	47,671
Polk Street	0.802	55,673
Freeman Street	0.198	13,829
Total		617,103

* Start date is August 2, 1924; end date is September 30, 2016 (with the exception of Yantacaw and Union Outlet, where the end date is 1975 due to lack of available detailed documentation).

Note: Numbers may not add to totals due to rounding.

Table 2-4 below shows the estimated solids mass bypassed by the PVSC to the Passaic River. To estimate pounds of solids mass bypassed, TSS data were applied to the bypass rates discussed above for each bypass (bypass time is multiplied by mass bypass rate). For the 1924-1991 period, estimated solids mass is based on average TSS data measured for stormy weather during 1974-1975 at each bypass. Starting in 1992, these TSS data were reduced by 55 percent to track an equivalent TSS decline observed in the PVSC's influent.³⁶ As a result, the estimated solids mass bypassed by the PVSC to the Passaic River is 1.155 billion pounds (or 577,636 tons) as shown in Table 2-4. Anchor QEA estimated the total solids mass from automatic CSOs at 0.587 billion

³⁶ Hazen and Sawyer, *Maximization of the Conveyance of Wastewater: Final Report*, prepared for the PVSC, December 1996, p.2.

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pounds (293,499 tons),³⁷ resulting in a total PVSC disposal of solids to the Passaic River of 1.742 billion pounds (871,135 tons).

Table 2-4. Bypassed Solids Mass (lb)

Bypass	Estimated Bypassed Solids (1924-2016)*
Yantacaw*	178,958,529
Union Outlet*	98,892,427
Verona Avenue	25,679,962
Herbert Place	39,984,396
4th Avenue	30,665,149
Clay Street	336,192,234
Rector Street	30,961,811
Saybrook Place	128,569,673
City Dock	160,207,171
Jackson Street	36,329,289
Polk Street	44,139,691
Freeman Street	44,690,992
Total	1,155,271,324

* Start date is August 2, 1924; end date is September 30, 2016 (with the exception of Yantacaw and Union Outlet, where the end date is 1975 due to lack of available detailed documentation after that date).

Note: Numbers may not add to totals due to rounding.

According to the 2016 ROD issued by EPA for the lower 8.3 miles of the Lower Passaic River, the eight COCs that pose the highest potential risk to human health and the environment at the site are:³⁸

- Dioxins and furans
- Polychlorinated biphenyls ("PCBs")
- Mercury
- Dichlorodiphenyltrichloroethane ("DDT")
- Copper

³⁷ Anchor QEA, PVSC CSO overflow and mass discharge estimates, 2017. (See Exhibit 2-8.)

³⁸ U.S. Environmental Protection Agency, Region II, Record of Decision: Lower 8.3 Miles of the Lower Passaic River, Part of the Diamond Alkali Superfund Site, March 3, 2016, pp. 14-16.

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- Dieldrin (HEOD or 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4 α ,5,6,7,8,8 α -octahydro-1,4-endo,exo-5,8-dimethanonaphthalene)
- Polycyclic aromatic hydrocarbons ("PAHs")
- Lead

Historical information measuring COCs in the PVSC sewage during the early decades of PVSC operation is sparse. Available studies indicate the following measurements for COCs:

- 1977 PCBs (due to the lack of PVSC sampling for PCBs during the chemicals' commercial production period of 1929 to 1976,³⁹ data are for influent measured at a POTW treatment facility in the City of Baltimore that is of comparable size and that treated waste from diverse PCB-using industries similar to those discharging to the PVSC)⁴⁰

³⁹ Commercial production of PCBs began in the United States in 1929. A PCB ban was implemented in 1977. However, there is evidence that PCBs have been found in the PVSC system at low levels long after their phase-out. For example, PCBs were measured at 300 ng/l in PVSC influent in 1999. Sources: United Nations Environment Programme - Chemicals, *Regionally Based Assessment of Persistent Toxic Substances, North America Regional Report*, December 2002, p.32; HartCrowser, Draft Engineering and Historical Review of PVSC CSOs, Prepared for Tierra Solutions, September 12, 2002, p.7-5, Table 7-2 (based on study by Durell and Lizotta, 1999) [MAXUS2959885].

⁴⁰ EPA, *PCBs Removal in Publicly-Owned Treatment Works*, July 16, 1977, pp 1-2, 7-8, and 59. In this report, EPA studied PCB removal at two publicly-owned treatment works ("POTWs"): a small 3.5 MGD plant in Bloomington, Indiana with one major PCB contributor (a capacitor manufacturer), and a larger, 180 MGD plant in Baltimore, Maryland where "the PCBs in the influent are more generally attributable to diverse industrial and domestic sources typical of a heavily-industrialized urban area." The average influent PCB concentrations were measured at 145 μ g/l for the Bloomington facility, and at 15 μ g/l for the Baltimore facility. The Baltimore concentration is used in this report due to the similarity in facility size, industrialized location, and industrial contributors (such as electric component and transformer manufacturers common to both areas as well as the common use of PCBs in hydraulic fluids, heat transfer fluids, and recycled paper) as compared to the PVSC system. The study also found a high correlation between PCB removal and TSS removal, noted as an expected result because prior studies show that "PCBs are adsorbed onto suspended solids." Note that the Baltimore POTW covers a similar size industrialized area (140 square miles) as the PVSC (150 square miles). Source: Baltimore City Department of Public Works, "Back River Wastewater Treatment Plant," accessed at <http://publicworks.baltimorecity.gov/pw-bureaus/water-wastewater/wastewater/back-river>. The Baltimore system also had sewer overflow and CSO overflow issues, leading to a Consent decree with EPA and DOJ in 2002 to address untreated discharges. Source: EPA, *City of Baltimore, Maryland, Sewer Overflows Settlement*, April 26, 2002 Consent Decree, accessed at <https://www.epa.gov/enforcement/city-baltimore-maryland-sewer-overflows-settlement>

Obtaining samples in a relevant time period is important for mass discharge estimates, as domestic PCB sales generally started around 1930, grew from the mid-1950s, and peaked in 1970, after which they dropped in half and were subsequently phased out later in the 1970s. Sources: EPA, *PCBs in the United States Industrial Use and Environmental Distribution: Task I*, February 25, 1976, pp. 198-207; Versar, Inc., *Polychlorinated Biphenyls 1929-1979: Final Report*, prepared for EPA, May 16, 1979, pp. 1-3.

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- 1978 Metals in PVSC influent⁴¹
- 1984-86 Select PAHs in PVSC influent (see listing of PAHs in Exhibit 2-6)⁴²

The sampling results from these studies are summarized in Exhibit 2-6. It is noted that sampling results are not available for each bypass, and that concentrations likely varied by bypass; however, the available sampling provides insights into an order-of-magnitude estimate for the mass of COCs bypassed by the PVSC to the Passaic River. Furthermore, the sample values in Exhibit 2-6 are expected to be low relative to earlier historical concentrations due to the imposition of industrial waste pretreatment requirements in the 1970s. In addition, the available PCB measurements do not cover the period when PCBs were in common use, prior to being phased out by the mid-1970s. Therefore, the bypassed COC estimates discussed below are likely to be low.

Using the measurements for COCs cited above, the mass of COCs bypassed by the PVSC is estimated by multiplying measured concentrations (from Exhibit 2-6) by estimated bypassed volume (summarized in Table 2-3). Starting in 1992, the concentrations are reduced by 55 percent (as discussed above for the mass calculations) to factor in a decline equivalent to the TSS decline observed in the PVSC's influent.⁴³ As shown in Table 2-5 below (and detailed in Exhibit 2-7), the total mass of COCs bypassed by the PVSC to the Passaic River during 1924-2016 is estimated conservatively low at 8,203,685 pounds (4,102 tons). Applying the same methodology to Anchor QEA's estimated CSO overflow volume yields an estimated 6,933,739 pounds (3,467 tons) of COCs that flowed into the Passaic River from these automatic overflows. Table 2-5 also

⁴¹ PVSC, Heavy Metals Source Determination, Phase II, 1980 (Summarizing Phase I sampling performed in 1978 [LPRSA0009923]).

⁴² CFM Incorporated, Investigation of Organic Priority Pollutants in the Influent to the PVSC Treatment Plant, May 1986, Tables 2-3 (measurements taken 11/1984-1/1986).

⁴³ Hazen and Sawyer, *Maximization of the Conveyance of Wastewater: Final Report*, prepared for the PVSC, December 1996, p.2.

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compares the estimated total PVSC discharges of COCs to the Passaic River to EPA's mass estimates for the selected COCs as calculated by EPA for the lower eight miles of the LPRSA.⁴⁴

Table 2-5. PVSC Bypasses and CSO Contaminants of Concern (lb)

COC	Estimated Bypass Mass (1924-2016)**	Estimated CSO Overflow Mass (1924-2016)**	Total Estimated PVSC Mass (1924-2016)**	EPA Estimated Mass in OU-2 Sediments
PCBs*	57,032	34,781	91,813	57,320
Mercury	242,254	205,152	447,406	92,594
Copper	1,015,838	860,258	1,876,096	4,629,708
Lead	3,804,812	3,222,088	7,026,900	7,054,792
Select PAHs (see Exhibit 2-6)	3,083,750	2,611,460	5,695,210	903,895
Total	8,203,685	6,933,739	15,137,424	

* The period for PCB mass estimation is 1930-1976.

** Start date is August 2, 1924; end date is September 30, 2016 (with the exception of Yantacaw and Union Outlet, where the end date is 1975 due to lack of available detailed documentation after this date).

Note: Numbers may not add to totals due to rounding.

CONCLUSIONS

As shown in Table 2-5, the PVSC is estimated to have discharged over 15 million pounds of COCs to the Passaic River during the 1924-2016 time-frame. When comparing these estimates of PVSC-discharged COCs to those estimated by EPA as present in the sediments of the lower eight

⁴⁴ EPA, Additional Contaminant Inventory Analysis for Lower Eight Miles of the Lower Passaic River, April 2019, Table 1.

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miles of the river (prior to Tierra Phase 2 Removal),⁴⁵ it is evident that the PVSC discharges alone could account for much of the mass of certain COCs⁴⁶ in OU-2.

⁴⁵ While interim activities removed some masses of COCs, for allocation purposes it is important to look at the total mass in the LPRSA driving the cleanup. Source: EPA, Additional Contaminant Inventory Analysis for Lower Eight Miles of the Lower Passaic River, April 2019, Table 1.

⁴⁶ Mass estimates are calculated for PCBs, mercury, copper, lead, and PAHs based on available historical concentration data.

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EXHIBIT 2-1

TIMELINE FOR MUNICIPALITIES SERVED BY THE PVSC

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Exhibit 2-1. Timeline for Municipalities Served by the PVSC

Year Joined	Municipality
1911	Belleville Clifton East Newark East Rutherford* Garfield Harrison Kearny Lyndhurst Newark North Arlington Nutley Passaic Paterson Rutherford* Wallington
1917	Bloomfield Glen Ridge Prospect Park
1918	East Orange*
1921	Haledon Montclair
1924 (PVSC starts operations)	Orange
1932	Lodi
1942	East Paterson
1943	Elmwood Park Saddle Brook* (portion may have joined in 1960)
1944	Glen Rock Hawthorne
1945	Fair Lawn* (portion may have joined in 1950)
1960	Little Falls
1963	Newark South Side
1971	South Hackensack
1980	North Haledon
1984	West Paterson
1986	Bayonne Jersey City

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Exhibit 2-1 (continued). Timeline for Municipalities Served by the PVSC

Year Joined	Municipality
Unknown	Cedar Grove (portion) Elizabeth (portion) Franklin Lakes (portion) Hackensack (portion) Hasbrouck Heights (portion) Hillside (portion) North Bergen North Caldwell (portion) Ridgewood (portion) South Orange (portion) Totowa Union City (portion) West Orange (portion) Woodland Park Wood-Ridge (portion)

* Possible that only a portion of the municipality joined at this time.

Sources: Undated PVSC presentation to EPA; PVSC 1972 Annual Report; PVSC 2013 Annual Report.

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EXHIBIT 2-2

SEWER AREAS SERVED BY PVSC BYPASSES

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Exhibit 2-2. Sewer Areas Served by PVSC Bypasses

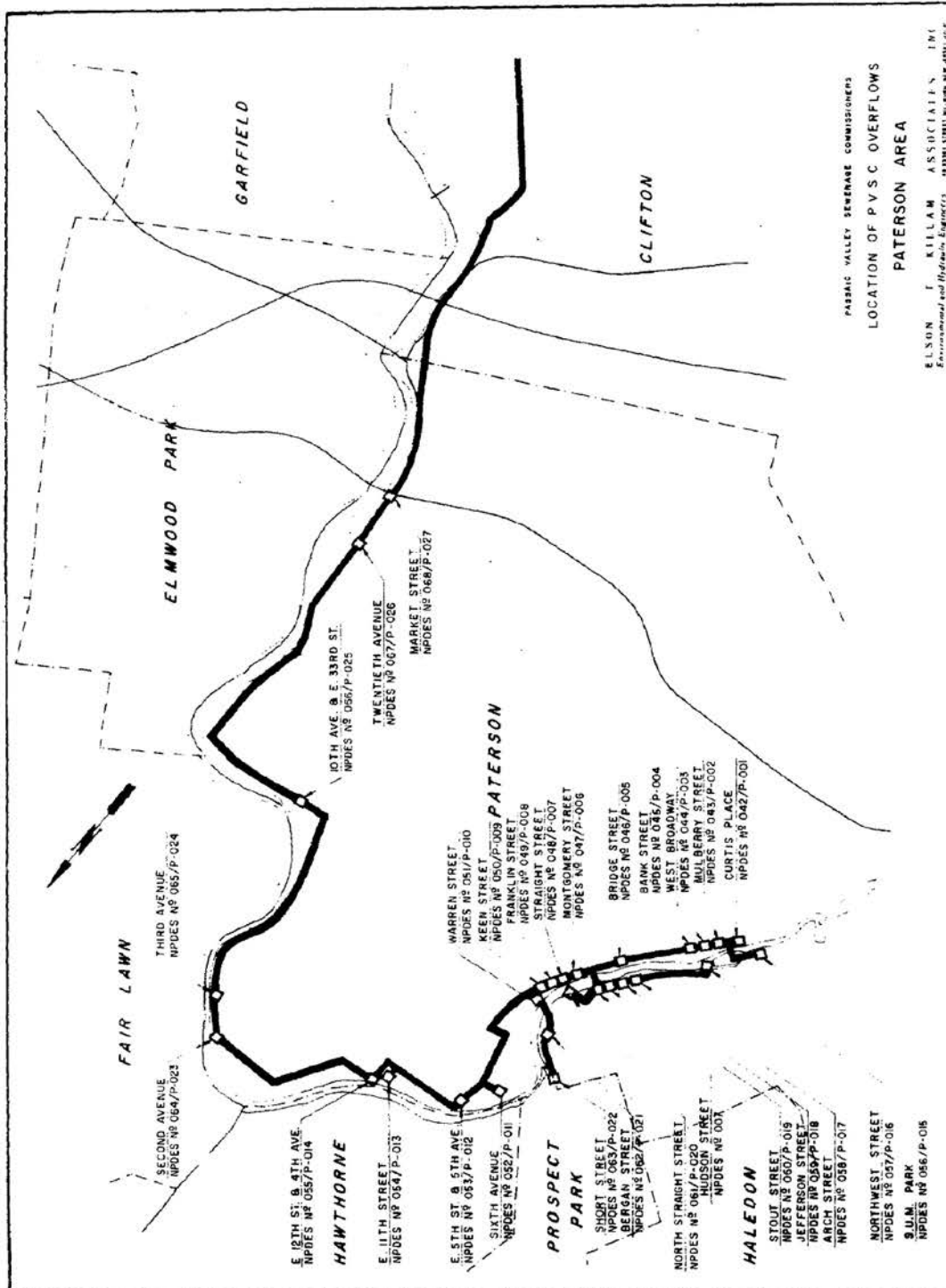
Bypass	Description	Area (Acres)	Source Bates Number
Yantacaw	Entire flow north of Third River (including Paterson, Lodi, Passaic, Clifton, Garfield, Haledon, Prospect Park, Hawthorne, Fair Lawn, Elmwood Park, Wallington and East Rutherford)	24,320	LPRSA0195596
Union Outlet	Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls	10,227	LPRSA0195645
Verona Avenue	Portion of Newark	367	LPRSA0195608
Herbert Place	Portion of Newark	298	LPRSA0195608
4th Avenue	Portion of Newark	225	LPRSA0195608
Clay Street	Portion of Newark; portion of East Orange	2,874	LPRSA0195608
Rector Street	Portion of Newark	177	LPRSA0195608
Saybrook Place	Portion of Newark	306	LPRSA0195608
City Dock	Portion of Newark	380	LPRSA0195608
Jackson Street	Portion of Newark	83	LPRSA0195608
Polk Street	Portion of Newark	199	LPRSA0195608
Freeman Street	Portion of Newark	149	LPRSA0195608
Total		39,605	

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, prepared for PVSC, 1976.

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EXHIBIT 2-3
MAPS OF PVSC BYPASSES
(FROM ELSON T. KILLAM ASSOCIATES, INC.,
REPORT UPON OVERFLOW ANALYSIS,
PREPARED FOR PVSC, 1976)

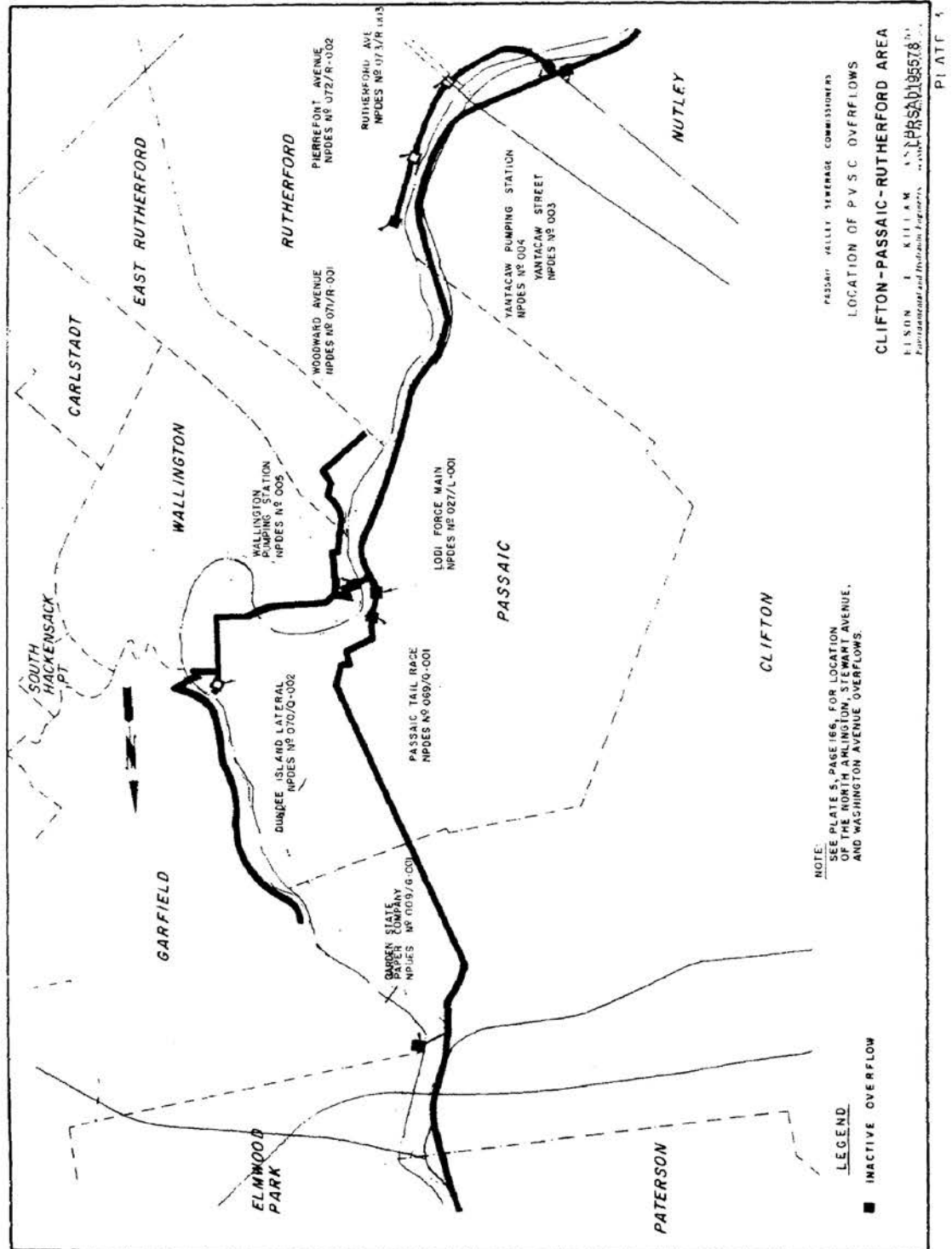


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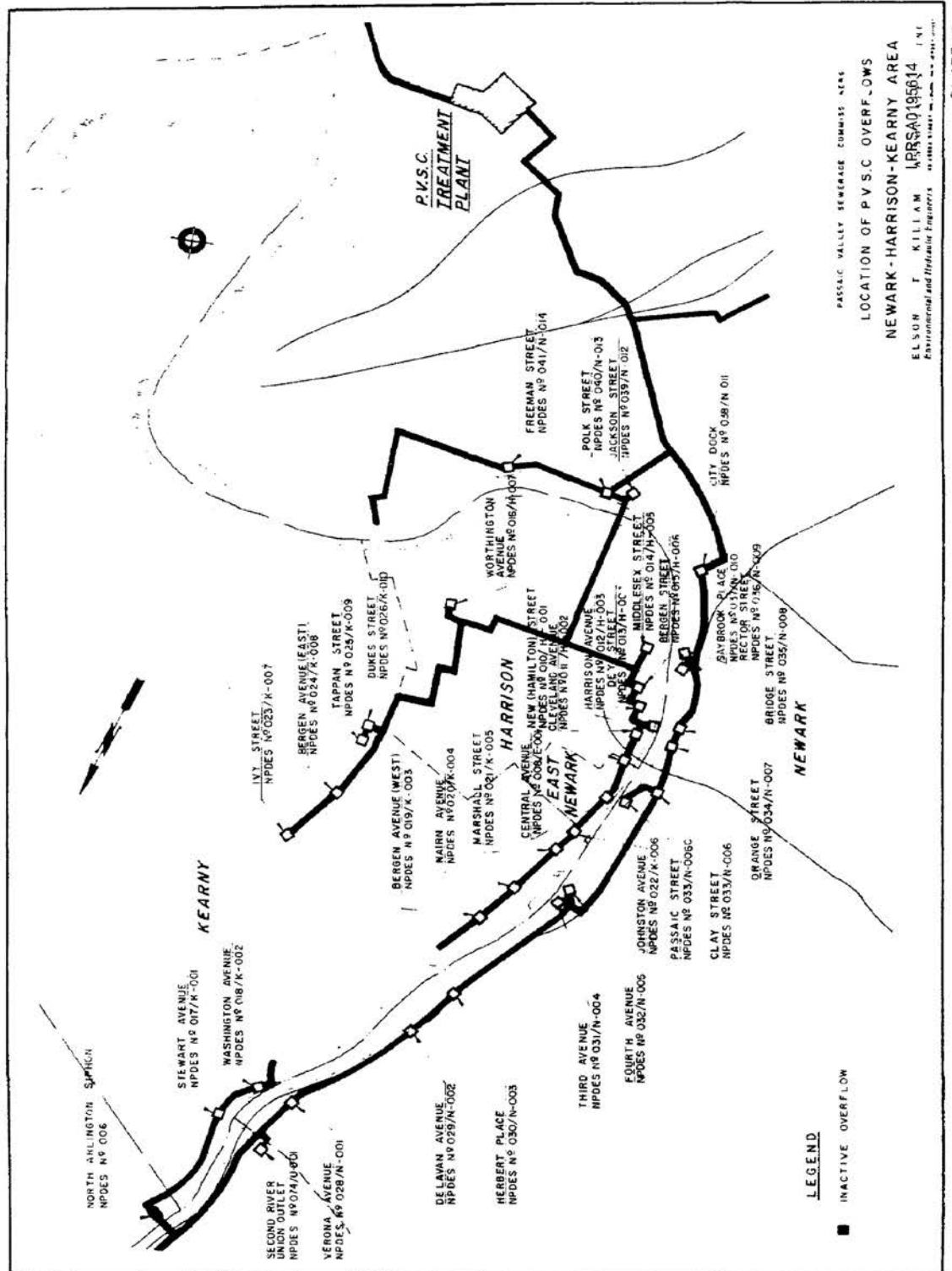
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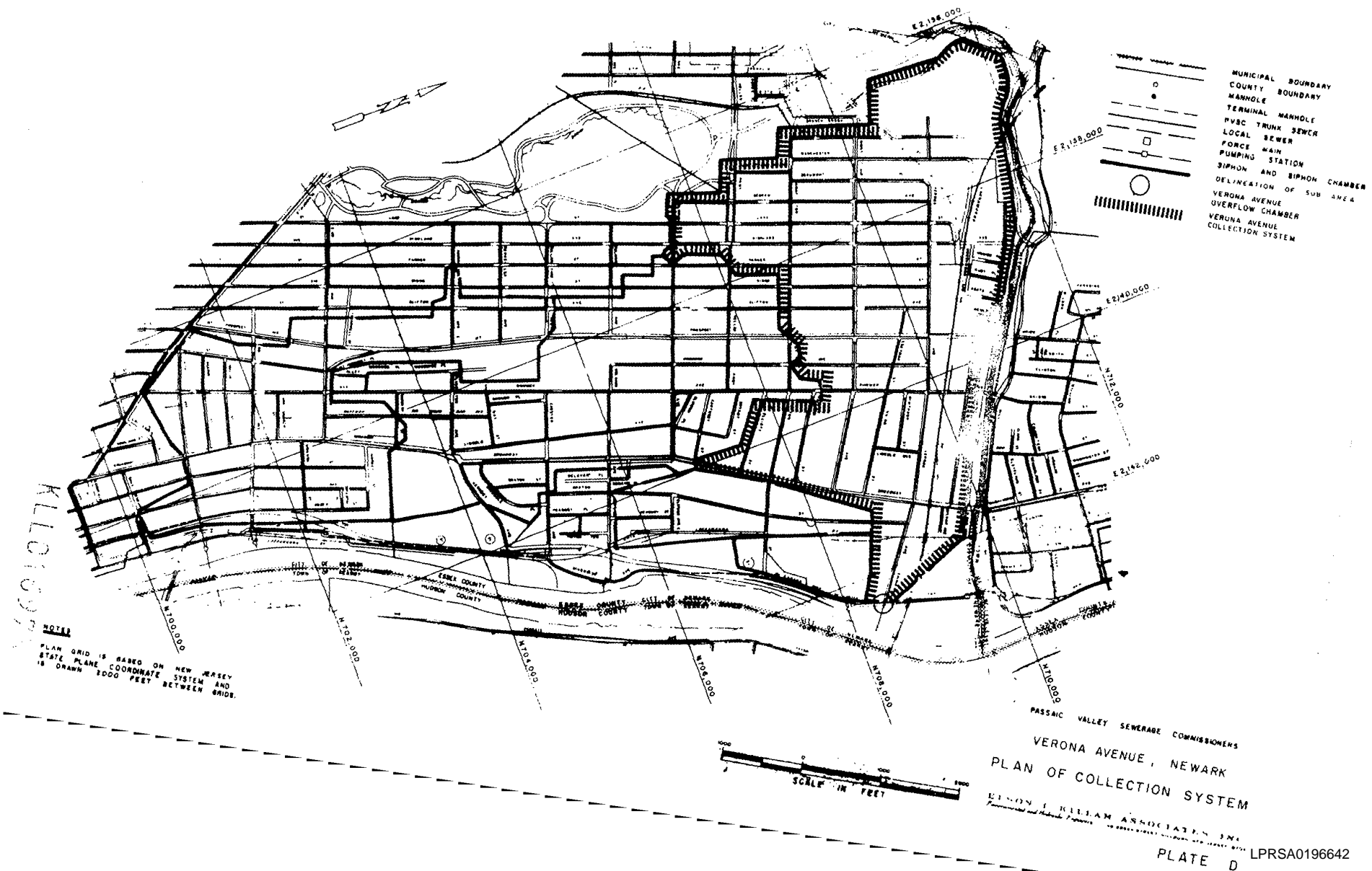
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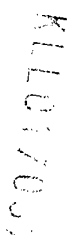
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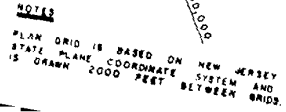
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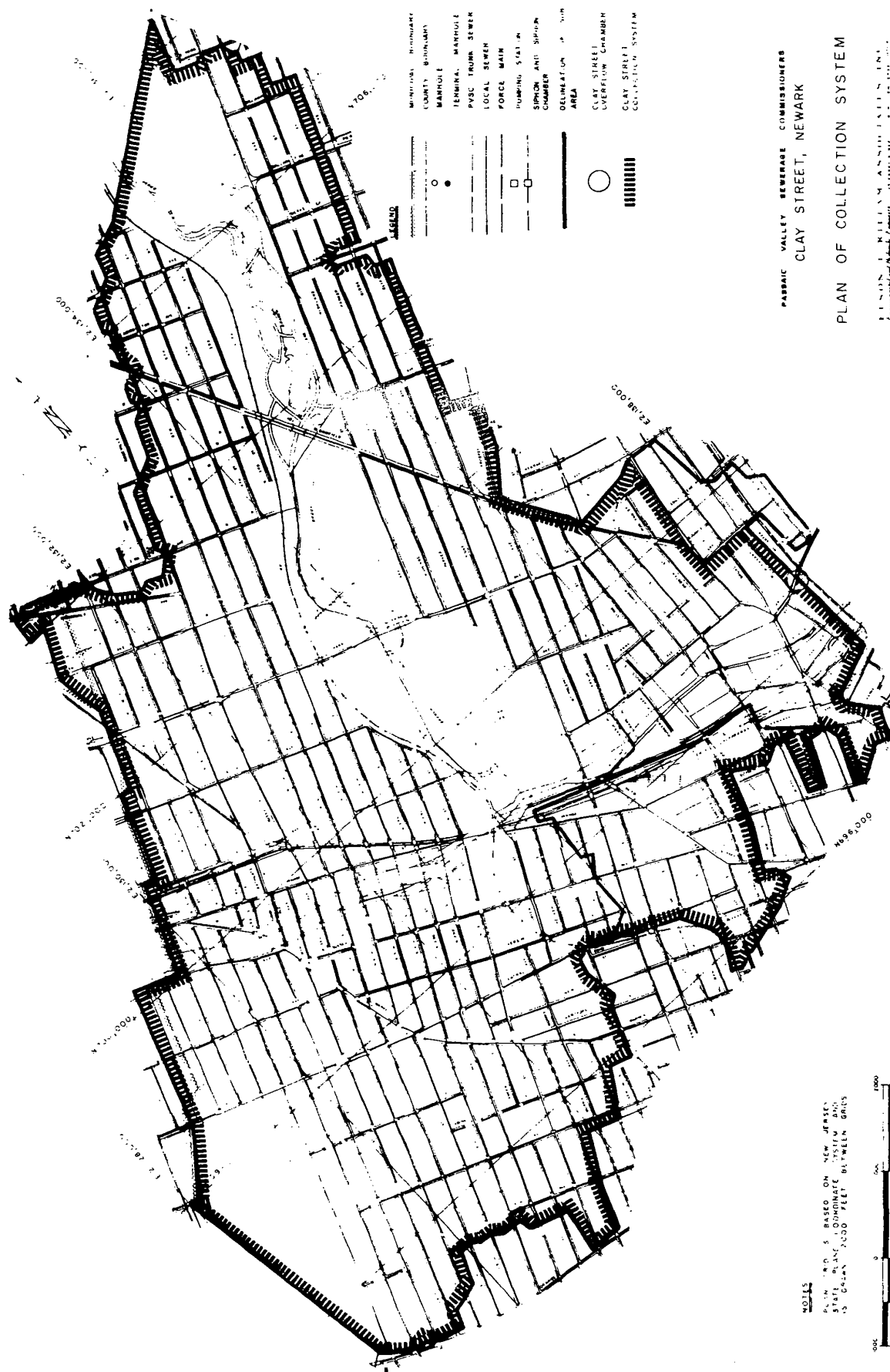
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ARR2975

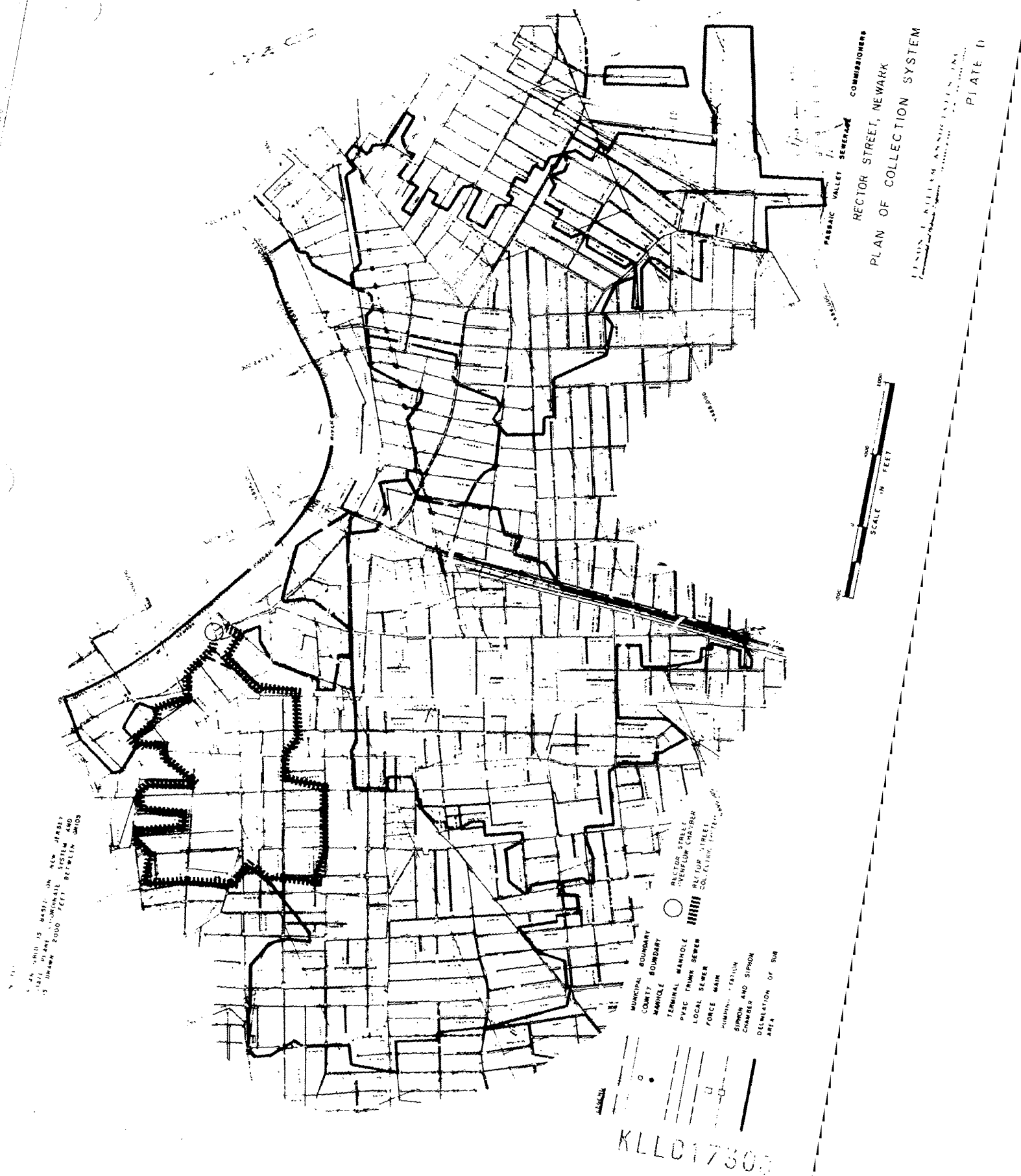






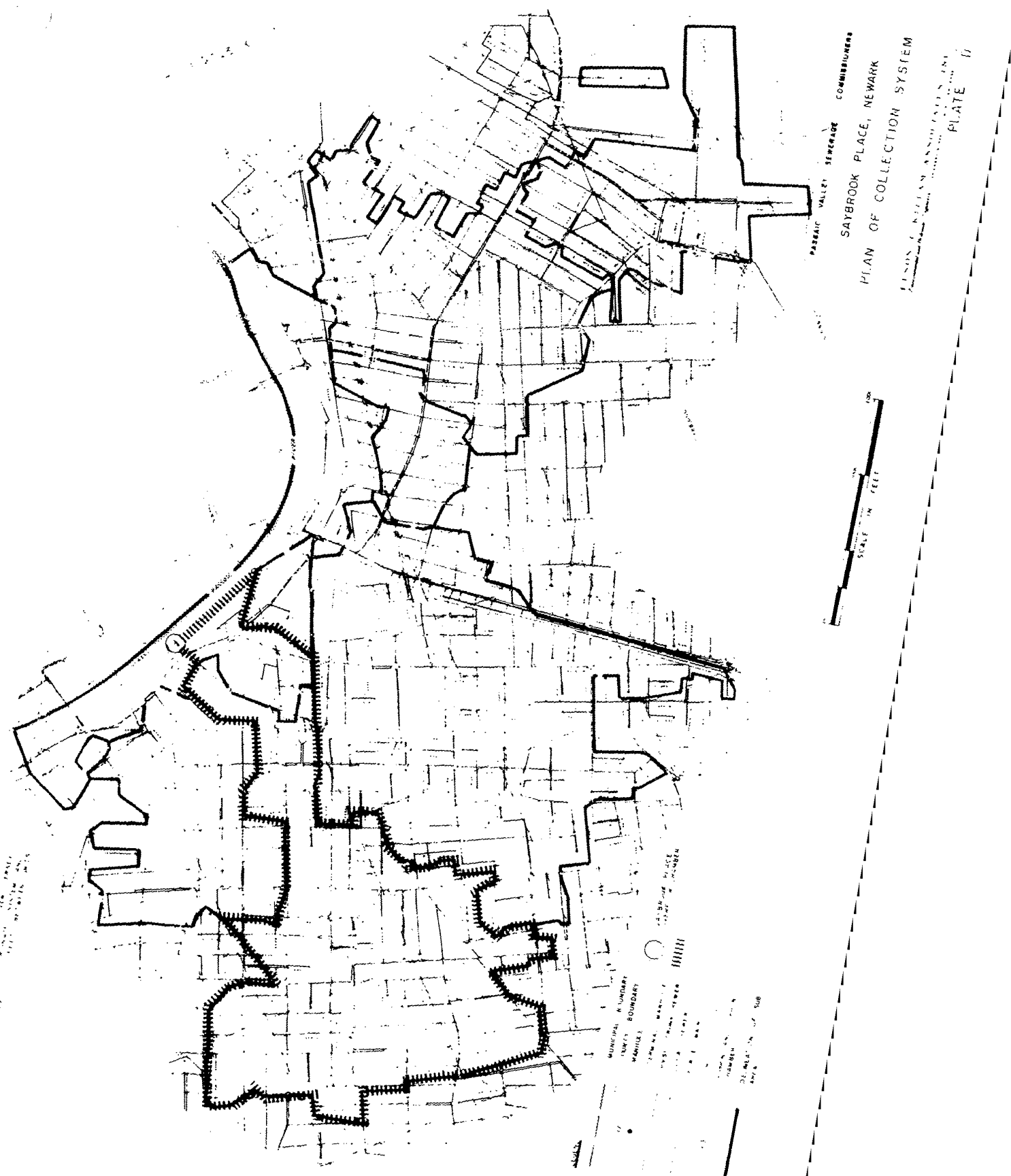
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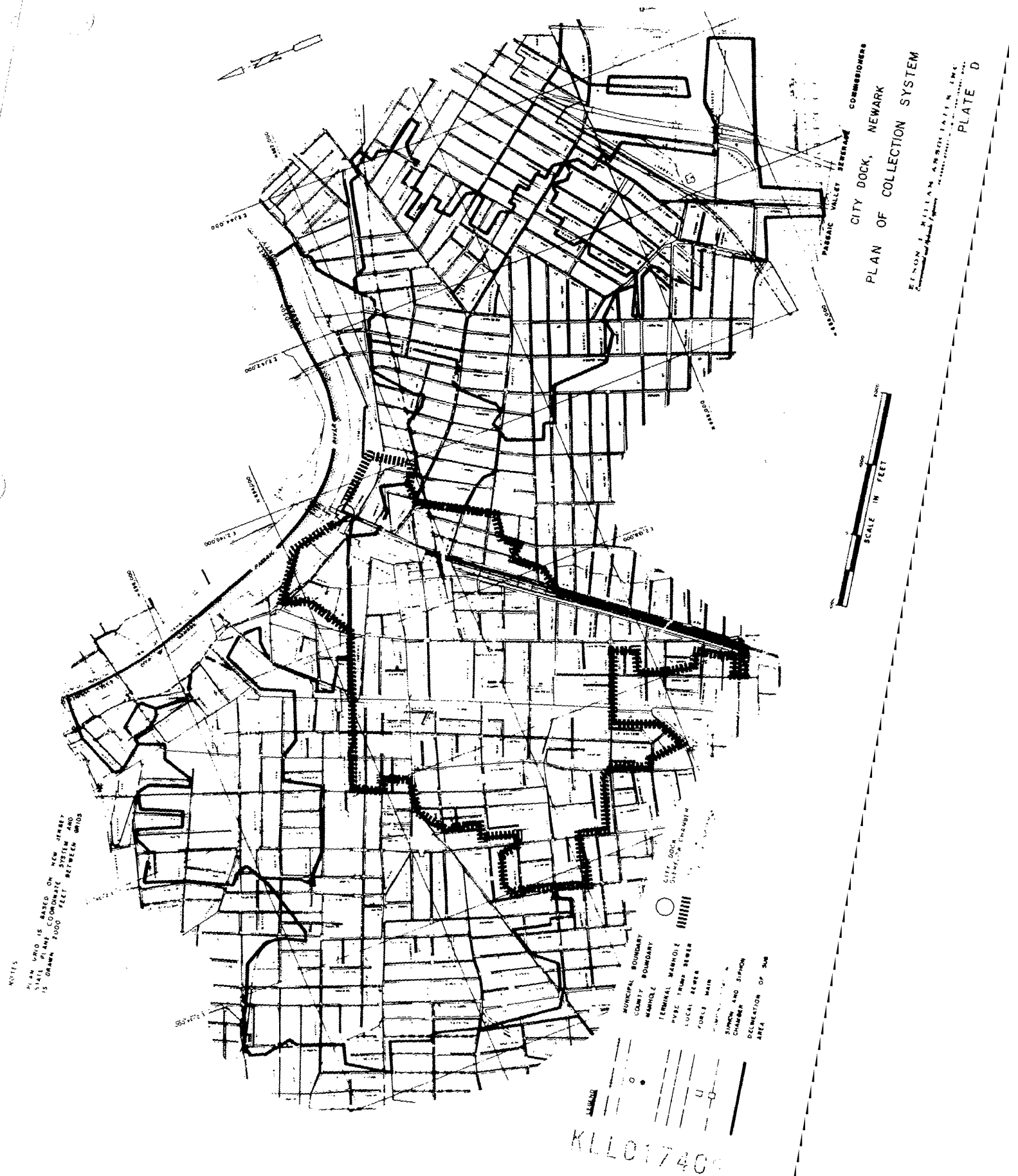
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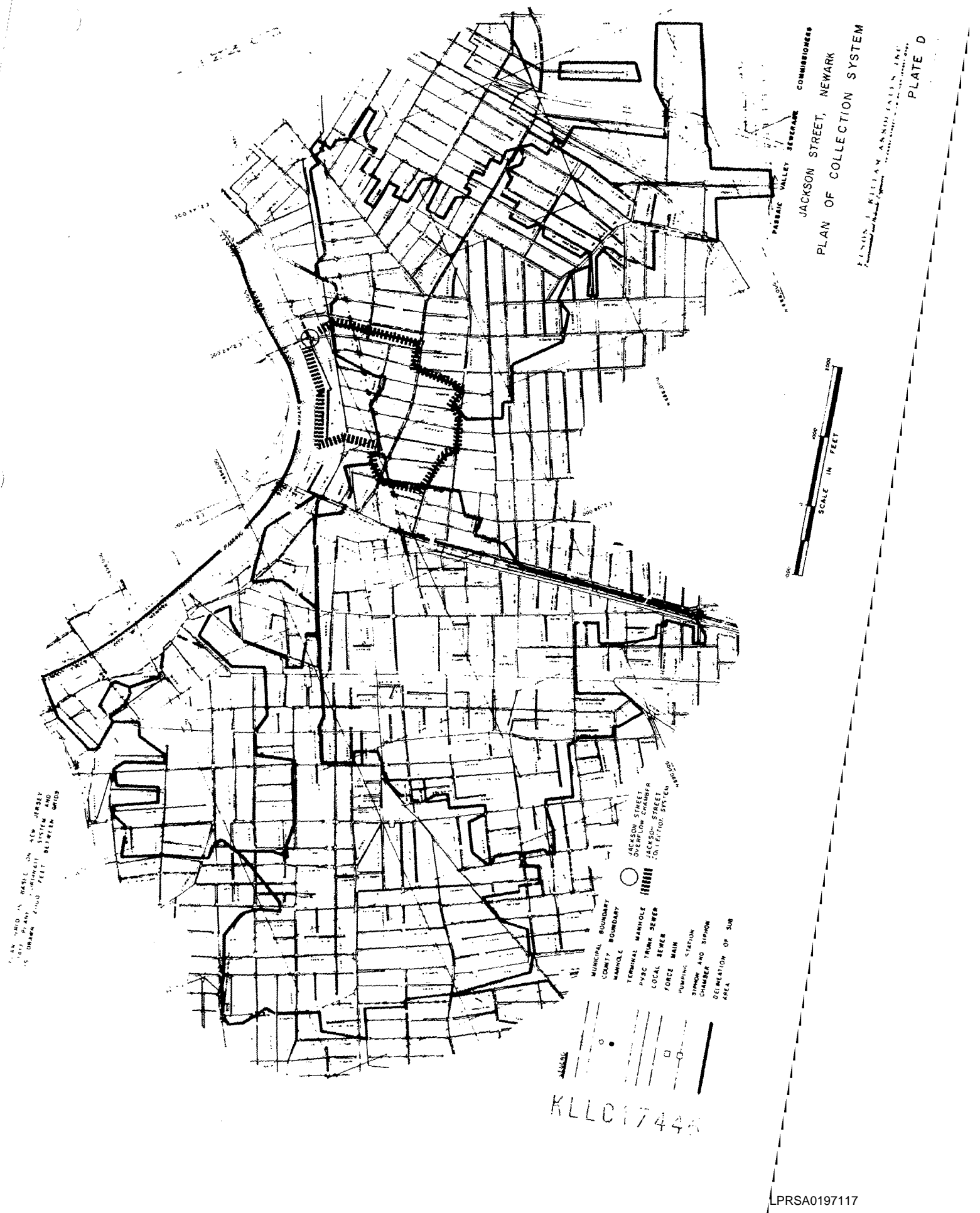
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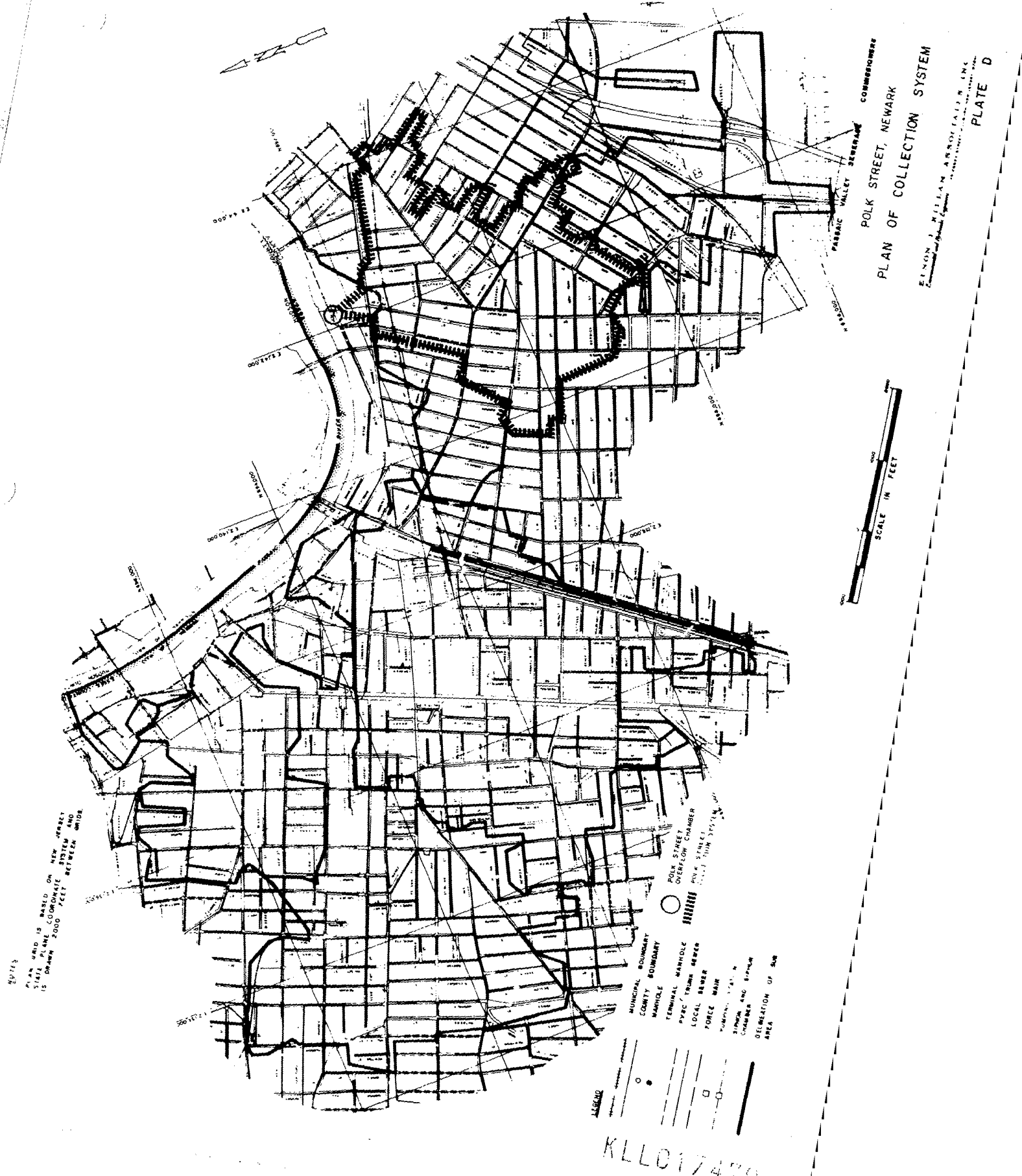
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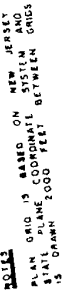
ARR2981





LPRSA0197150

ARR2983



(6)

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EXHIBIT 2-4

DOCUMENTED PVSC BYPASSES

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Exhibit 2-4a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1950-1962)

*	8/2/24 12:00 PM	10/3/50 11:59 PM	LPRSA0198629				
	10/4/50 10:00 PM	10/5/50 11:30 AM	13:30:00 LPRSA0188654	ABC012674			
	10/10/50 2:30 AM	10/10/50 8:30 AM	6:00:00 LPRSA0188652	ABC012672			
	10/12/50 1:30 PM	10/13/50 9:30 AM	20:00:00 LPRSA0188650	ABC012670			
	10/23/50 1:30 PM	10/24/50 9:00 AM	19:30:00 LPRSA0188648	ABC012668			
	11/20/50 6:00 PM	11/21/50 9:00 AM	15:00:00 LPRSA0188646	ABC012666			
	11/25/50 9:00 AM	11/25/50 1:00 PM	4:00:00 LPRSA0188643	ABC012663			
	12/4/50 12:30 PM	12/4/50 9:00 PM	8:30:00 LPRSA0188641	ABC012661			
	12/7/50 4:00 PM	12/8/50 11:30 AM	19:30:00 LPRSA0188637	ABC012657			
	12/15/50 10:30 PM	12/16/50 9:00 AM	10:30:00 LPRSA0188639	ABC012659			
	12/29/50 12:30 PM	12/30/50 11:30 AM	23:00:00 LPRSA0188635	ABC012655			
	1/7/51 5:00 PM	1/8/51 9:00 AM	16:00:00 LPRSA0188633	ABC012653			
	1/11/51 5:30 PM	1/12/51 8:30 AM	15:00:00 LPRSA0188619	ABC012639			
	1/14/51 6:00 PM	1/15/51 12:00 PM	18:00:00 LPRSA0188631	ABC012651			
	1/23/51 2:00 AM	1/24/51 2:00 PM	36:00:00 LPRSA0188621	ABC012641			
	1/25/51 4:00 PM	1/25/51 7:00 PM	3:00:00 LPRSA0188623	ABC012643			
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	1/29/51 7:30 PM	1/30/51 10:00 AM	14:30:00 LPRSA0188625	ABC012645			
	1/31/51 4:00 PM	2/1/51 3:00 PM	23:00:00 LPRSA0188628	ABC012648			
	2/7/51 11:00 AM	2/7/51 7:30 PM	8:30:00 LPRSA0188585	ABC012605			
	2/10/51 5:30 AM	2/10/51 12:00 PM	6:30:00 LPRSA0188588	ABC012608			
	2/11/51 6:00 PM	2/13/51 8:30 AM	38:30:00 LPRSA0188588	ABC012608			
	2/13/51 7:45 PM	2/14/51 10:00 AM	14:15:00 LPRSA0188588	ABC012608			
	2/14/51 5:45 PM	2/15/51 9:30 AM	15:45:00 LPRSA0188588	ABC012608			
	2/17/51 4:00 AM	2/17/51 10:00 PM	18:00:00 LPRSA0188588	ABC012608			
	2/19/51 5:00 PM	2/20/51 9:30 AM	16:30:00 LPRSA0188596	ABC012616			
	2/20/51 4:00 PM	2/21/51 5:30 PM	25:30:00 LPRSA0188596	ABC012616			
	2/22/51 10:30 AM	2/22/51 11:45 AM	1:15:00 LPRSA0188596	ABC012616			
	2/23/51 8:30 AM	2/23/51 10:00 AM	1:30:00 LPRSA0188596	ABC012616			
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Exhibit 2-4a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
4/25/52 8:00 AM	4/25/52 7:00 PM	11:00:00	LPRSA0189744	ABC013764				
4/26/52 10:00 AM	4/28/52 10:30 AM	48:30:00	LPRSA0189744	ABC013764				
4/29/52 4:15 PM	4/30/52 9:00 AM	16:45:00	LPRSA0189745	ABC013765				
5/5/52 9:00 AM	5/5/52 4:30 PM	7:30:00	LPRSA0189745	ABC013765				
5/6/52 3:00 PM	5/6/52 9:30 PM	6:30:00	LPRSA0189745	ABC013765				
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5/13/52 2:00 PM	5/14/52 8:00 AM	18:00:00	LPRSA0189743	ABC013763				
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5/19/52 6:00 PM	5/20/52 2:30 PM	20:30:00	LPRSA0189741	ABC013761				
5/21/52 3:15 PM	5/22/52 9:00 AM	17:45:00	LPRSA0189741	ABC013761				
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5/26/52 10:00 AM	5/27/52 8:00 AM	22:00:00	LPRSA0189740	ABC013760				
5/31/52 3:30 AM	5/31/52 8:00 AM	4:30:00	LPRSA0189738	ABC013758				
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6/9/52 8:00 AM	6/10/52 4:30 PM	32:30:00	LPRSA0189736	ABC013756				
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6/17/52 4:30 PM	6/17/52 8:45 PM	4:15:00	LPRSA0189735	ABC013755				
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6/27/52 3:30 PM	6/28/52 8:00 AM	16:30:00	LPRSA0189729	ABC013749				
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9/15/52 3:00 PM	9/17/52 4:00 PM	49:00:00	LPRSA0189709	ABC013729				
9/18/52 12:00 PM	9/20/52 8:00 AM	44:00:00	LPRSA0189710	ABC013730				
9/23/52 9:30 AM	9/23/52 1:00 PM	3:30:00	LPRSA0189708	ABC013728				
10/2/52 6:00 PM	10/2/52 9:30 PM	3:30:00	LPRSA0189707	ABC013727				
10/28/52 4:30 PM	10/29/52 8:00 AM	15:30:00	LPRSA0189706	ABC013726				
11/2/52 8:15 AM	11/2/52 1:15 PM	5:00:00	LPRSA0189705	ABC013725				
11/3/52 1:00 PM	11/4/52 8:00 AM	19:00:00	LPRSA0189703	ABC013723				
11/10/52 3:30 PM	11/11/52 8:00 AM	16:30:00	LPRSA0189704	ABC013724				
11/14/52 3:15 PM	12/1/52 12:45 PM	405:30:00	LPRSA0189701	ABC013721				
12/2/52 1:00 PM	12/5/52 5:00 PM	76:00:00	LPRSA0189702	ABC013722				
12/9/52 10:30 AM	1/18/53 4:15 PM	965:45:00	LPRSA0189655	ABC013675				
1/21/53 2:00 PM	1/22/53 8:00 AM	18:00:00	LPRSA0189656	ABC013676				
1/24/53 9:00 AM	1/24/53 3:00 PM	6:00:00	LPRSA0189657	ABC013677				
2/11/53 4:30 PM	2/13/53 9:30 AM	41:00:00	LPRSA0189658	ABC013678				
2/15/53 10:00 AM	2/15/53 3:30 PM	5:30:00	LPRSA0189659	ABC013679				
2/21/53 8:00 AM	2/21/53 1:30 PM	5:30:00	LPRSA0189660	ABC013680				
2/25/53 8:00 AM	3/10/53 7:00 PM	323:00:00	LPRSA0189661	ABC013681				

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Exhibit 2-4a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
3/14/53 12:00 PM	3/15/53 2:30 PM	26:30:00	LPRSA0189663	ABC013683				
3/16/53 12:00 AM	3/23/53 1:00 PM	181:00:00	LPRSA0189663	ABC013683				
3/24/53 8:45 AM	3/24/53 4:00 PM	7:15:00	LPRSA0189663	ABC013683				
3/25/53 1:30 PM	3/25/53 7:30 PM	6:00:00	LPRSA0189663	ABC013683				
3/27/53 1:00 PM	3/28/53 7:00 PM	30:00:00	LPRSA0189663	ABC013683				
3/30/53 1:45 PM	3/31/53 9:00 AM	19:15:00	LPRSA0189663	ABC013683				
3/31/53 4:30 PM	4/6/53 9:00 AM	136:30:00	LPRSA0189663	ABC013683				
4/6/53 4:30 PM	4/10/53 1:30 PM	93:00:00	LPRSA0189663	ABC013683				
4/11/53 11:30 AM	4/13/53 9:30 AM	46:00:00	LPRSA0189663	ABC013683				
4/13/53 2:15 PM	4/14/53 8:30 AM	18:15:00	LPRSA0189663	ABC013683				
4/14/53 11:30 AM	4/15/53 9:00 AM	21:30:00	LPRSA0189663	ABC013683				
4/15/53 11:30 AM	4/16/53 2:30 PM	27:00:00	LPRSA0189663	ABC013683				
4/16/53 4:00 PM	4/17/53 8:00 AM	16:00:00	LPRSA0189663	ABC013683				
4/17/53 1:00 PM	4/23/53 1:00 PM	144:00:00	LPRSA0189663	ABC013683				
4/29/53 3:30 PM	4/30/53 8:00 AM	16:30:00	LPRSA0189663	ABC013683				
4/30/53 3:30 PM	5/1/53 11:30 AM	20:00:00	LPRSA0189663	ABC013683				
5/1/53 2:45 PM	5/4/53 8:30 AM	65:45:00	LPRSA0189663	ABC013683				
5/5/53 1:00 PM	5/8/53 9:00 AM	68:00:00	LPRSA0189663	ABC013683				
5/8/53 9:00 PM	5/9/53 8:00 AM	11:00:00	LPRSA0189663	ABC013683				
5/13/53 9:30 PM	5/14/53 9:00 AM	11:30:00	LPRSA0189663	ABC013683				
5/14/53 3:00 PM	5/15/53 9:45 AM	18:45:00	LPRSA0189663	ABC013683				
5/15/53 3:30 PM	5/16/53 8:00 AM	16:30:00	LPRSA0189663	ABC013683				
5/18/53 8:30 AM	5/22/53 5:45 PM	105:15:00	LPRSA0189663	ABC013683				
5/25/53 9:30 AM	5/25/53 3:30 PM	6:00:00	LPRSA0189663	ABC013683				
5/27/53 11:00 AM	5/27/53 1:00 PM	2:00:00	LPRSA0189663	ABC013683				
6/1/53 12:00 PM	6/6/53 8:00 AM	116:00:00	LPRSA0189663	ABC013683				
6/8/53 1:30 PM	6/11/53 11:30 AM	70:00:00	LPRSA0189663	ABC013683				
6/13/53 4:30 PM	6/14/53 1:30 PM	21:00:00	LPRSA0189674	ABC013694				
6/18/53 4:00 PM	6/19/53 9:00 AM	17:00:00	LPRSA0189676	ABC013696				
6/22/53 9:30 AM	6/22/53 6:15 PM	8:45:00	LPRSA0189677	ABC013697				
6/23/53 9:30 AM	7/2/53 1:30 PM	220:00:00	LPRSA0189678	ABC013698				
7/6/53 7:30 PM	7/7/53 8:00 AM	12:30:00	LPRSA0189681	ABC013701				
7/20/53 9:00 PM	7/21/53 8:15 AM	11:15:00	LPRSA0189682	ABC013702				
7/23/53 8:30 AM	7/23/53 3:00 PM	6:30:00	LPRSA0189684	ABC013704				
8/10/53 12:45 AM	8/10/53 8:30 AM	7:45:00	LPRSA0189685	ABC013705				
8/14/53 1:00 PM	8/14/53 7:30 PM	6:30:00	LPRSA0189686	ABC013706				
9/16/53 1:30 AM	9/16/53 8:00 AM	6:30:00	LPRSA0189688	ABC013708				
10/6/53 6:00 PM	10/7/53 8:30 AM	14:30:00	LPRSA0189689	ABC013709				
10/22/53 1:00 PM	10/28/53 1:45 PM	144:45:00	LPRSA0189691	ABC013711				
10/29/53 1:30 PM	10/30/53 8:30 AM	19:00:00	LPRSA0189693	ABC013713				
11/7/53 6:30 AM	11/8/53 2:00 PM	31:30:00	LPRSA0189695	ABC013715				
11/16/53 2:00 PM	11/20/53 11:30 AM	93:30:00	LPRSA0189696	ABC013716				
11/23/53 9:30 AM	11/23/53 4:15 PM	6:45:00	LPRSA0189698	ABC013718				
11/25/53 9:30 AM	11/26/53 8:30 AM	23:00:00	LPRSA0189652	ABC013672				
11/30/53 9:30 AM	12/4/53 10:30 AM	97:00:00	LPRSA0189651	ABC013671				
12/6/53 9:00 AM	12/7/53 8:40 AM	23:40:00	LPRSA0189650	ABC013670				
12/9/53 3:20 PM	12/10/53 11:30 AM	20:10:00	LPRSA0189649	ABC013669				
12/12/53 5:00 PM	12/13/53 8:00 AM	15:00:00	LPRSA0189648	ABC013668				
12/14/53 5:30 AM	12/14/53 12:00 PM	6:30:00	LPRSA0189647	ABC013667				
12/28/53 4:15 PM	12/29/53 9:00 AM	16:45:00	LPRSA0189646	ABC013666				
1/14/54 4:00 PM	1/18/54 9:00 AM	89:00:00	LPRSA0189592	ABC013612				
1/18/54 2:00 PM	1/21/54 9:00 AM	67:00:00	LPRSA0189591	ABC013611				
1/22/54 3:30 PM	1/25/54 9:15 AM	65:45:00	LPRSA0189590	ABC013610				
1/25/54 2:30 PM	1/27/54 4:00 PM	49:30:00	LPRSA0189590	ABC013610				

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Exhibit 2-4a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
2/3/54 12:45 PM	2/4/54 8:30 AM	19:45:00	LPRSA0189589	ABC013609				
2/8/54 5:00 PM	2/9/54 9:00 AM	16:00:00	LPRSA0189588	ABC013608				
2/16/54 4:30 PM	2/17/54 1:15 PM	20:45:00	LPRSA0189587	ABC013607				
2/21/54 4:45 PM	2/22/54 8:15 AM	15:30:00	LPRSA0189586	ABC013606				
2/23/54 11:15 AM	2/27/54 8:15 AM	93:00:00	LPRSA0189621	ABC013641				
3/1/54 10:15 AM	3/5/54 1:00 PM	98:45:00	LPRSA0189619	ABC013639				
3/13/54 2:30 PM	3/15/54 8:30 AM	42:00:00	LPRSA0189618	ABC013638				
3/19/54 4:00 PM	3/20/54 8:30 AM	16:30:00	LPRSA0189617	ABC013637				
3/25/54 9:45 AM	3/26/54 7:45 AM	22:00:00	LPRSA0189616	ABC013636				
4/8/54 1:30 PM	4/8/54 3:45 PM	2:15:00	LPRSA0189613	ABC013633				
4/13/54 12:00 PM	4/13/54 4:00 PM	4:00:00	LPRSA0189623	ABC013643				
4/16/54 12:50 PM	4/18/54 9:45 AM	44:55:00	LPRSA0189632	ABC013652				
4/19/54 5:45 PM	4/21/54 4:30 PM	46:45:00	LPRSA0189615	ABC013635				
4/23/54 1:00 PM	4/23/54 4:00 PM	3:00:00	LPRSA0189614	ABC013634				
4/28/54 3:00 PM	4/28/54 4:45 PM	1:45:00	LPRSA0189612	ABC013632				
5/3/54 10:30 AM	5/22/54 8:30 AM	454:00:00	LPRSA0189631	ABC013651				
6/3/54 5:00 PM	6/8/54 4:00 PM	119:00:00	LPRSA0189630	ABC013650				
6/23/54 4:00 PM	6/24/54 8:00 AM	16:00:00	LPRSA0189628	ABC013648				
7/7/54 4:00 PM	7/8/54 9:00 AM	17:00:00	LPRSA0189624	ABC013644				
7/14/54 4:00 PM	7/15/54 8:30 AM	16:30:00	LPRSA0189634	ABC013654				
7/22/54 3:30 PM	7/23/54 8:30 AM	17:00:00	LPRSA0189633	ABC013653				
8/3/54 8:45 AM	8/4/54 8:45 AM	24:00:00	LPRSA0189620	ABC013640				
8/9/54 8:30 AM	8/9/54 1:30 PM	5:00:00	LPRSA0189622	ABC013642				
8/19/54 10:30 PM	8/20/54 9:00 AM	10:30:00	LPRSA0189611	ABC013631				
8/20/54 4:00 PM	8/22/54 8:00 AM	40:00:00	LPRSA0189610	ABC013630				
8/25/54 4:15 PM	8/26/54 8:45 AM	16:30:00	LPRSA0189609	ABC013629				
8/30/54 4:15 PM	8/31/54 4:30 AM	12:15:00	LPRSA0189608	ABC013628				
8/31/54 3:30 AM	9/1/54 8:00 AM	28:30:00	LPRSA0189608	ABC013628				
9/8/54 2:00 PM	9/9/54 8:00 AM	18:00:00	LPRSA0189607	ABC013627				
9/10/54 4:00 PM	9/12/54 1:30 PM	45:30:00	LPRSA0189606	ABC013626				
9/14/54 4:15 PM	9/18/54 8:00 AM	87:45:00	LPRSA0189605	ABC013625				
10/4/54 8:30 AM	10/8/54 4:00 PM	103:30:00	LPRSA0189604	ABC013624				
10/15/54 2:10 PM	10/15/54 11:00 PM	8:50:00	LPRSA0189603	ABC013623				
10/27/54 4:00 PM	10/28/54 9:00 AM	17:00:00	LPRSA0189602	ABC013622				
10/29/54 9:00 AM	11/1/54 8:00 AM	71:00:00	LPRSA0189601	ABC013621				
11/2/54 12:30 PM	11/2/54 5:30 PM	5:00:00	LPRSA0189600	ABC013620				
11/15/54 9:15 AM	11/15/54 3:00 PM	5:45:00	LPRSA0189597	ABC013617				
11/17/54 4:00 PM	11/18/54 10:00 AM	18:00:00	LPRSA0189597	ABC013617				
11/18/54 3:10 PM	11/20/54 6:00 AM	38:50:00	LPRSA0189597	ABC013617				
11/25/54 9:50 AM	11/29/54 9:15 AM	95:25:00	LPRSA0189597	ABC013617				
11/29/54 3:30 PM	11/30/54 12:30 PM	21:00:00	LPRSA0189597	ABC013617				
12/9/54 1:30 PM	12/9/54 5:30 PM	4:00:00	LPRSA0189596	ABC013616				
12/14/54 9:00 AM	12/14/54 3:30 PM	6:30:00	LPRSA0189595	ABC013615				
12/16/54 1:45 PM	12/16/54 7:45 PM	6:00:00	LPRSA0189594	ABC013614				
12/18/54 10:00 AM	12/19/54 8:00 AM	22:00:00	LPRSA0189593	ABC013613				
12/29/54 12:30 PM	12/30/54 3:15 PM	26:45:00	LPRSA0189585	ABC013605				
1/6/55 1:30 PM	1/6/55 3:30 PM	2:00:00	LPRSA0189582	ABC013602				
1/28/55 3:30 PM	1/31/55 1:00 PM	69:30:00	LPRSA0189580	ABC013600				
2/1/55 2:45 PM	2/2/55 10:30 AM	19:45:00	LPRSA0189580	ABC013600				
2/4/55 11:50 PM	2/7/55 12:55 AM	49:05:00	LPRSA0189580	ABC013600				
2/7/55 2:30 PM	2/8/55 9:00 AM	18:30:00	LPRSA0189580	ABC013600				
2/8/55 12:15 PM	2/12/55 12:00 PM	95:45:00	LPRSA0189580	ABC013600				
2/15/55 2:45 PM	2/15/55 5:45 PM	3:00:00	LPRSA0189580	ABC013600				
2/16/55 3:30 PM	2/16/55 6:30 PM	3:00:00	LPRSA0189580	ABC013600				

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Exhibit 2-4a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
2/17/55 10:45 AM	2/18/55 9:00 AM	22:15:00	LPRSA0189580	ABC013600				
2/18/55 4:00 PM	2/19/55 8:45 AM	16:45:00	LPRSA0189579	ABC013599				
2/21/55 2:30 PM	2/23/55 1:00 PM	46:30:00	LPRSA0189579	ABC013599				
2/23/55 3:45 PM	2/24/55 9:45 AM	18:00:00	LPRSA0189579	ABC013599				
2/24/55 3:30 PM	2/25/55 9:00 AM	17:30:00	LPRSA0189579	ABC013599				
2/25/55 3:15 PM	2/26/55 8:45 AM	17:30:00	LPRSA0189579	ABC013599				
2/28/55 1:15 PM	3/2/55 9:00 AM	43:45:00	LPRSA0189579	ABC013599				
3/2/55 2:00 PM	3/3/55 1:00 PM	23:00:00	LPRSA0189579	ABC013599				
3/3/55 4:00 PM	3/4/55 10:15 AM	18:15:00	LPRSA0189579	ABC013599				
3/4/55 12:30 PM	3/6/55 5:15 PM	52:45:00	LPRSA0189579	ABC013599				
3/7/55 1:00 PM	3/7/55 3:45 PM	2:45:00	LPRSA0189578	ABC013598				
3/21/55 2:30 PM	3/22/55 3:00 PM	24:30:00	LPRSA0189577	ABC013597				
3/28/55 1:00 PM	3/29/55 10:00 AM	21:00:00	LPRSA0189576	ABC013596				
4/6/55 11:00 AM	4/7/55 9:00 AM	22:00:00	LPRSA0189575	ABC013595				
4/12/55 2:00 PM	4/13/55 12:45 PM	22:45:00	LPRSA0189574	ABC013594				
4/26/55 12:45 PM	4/27/55 8:45 AM	20:00:00	LPRSA0189573	ABC013593				
5/31/55 12:45 PM	6/1/55 7:45 AM	19:00:00	LPRSA0189572	ABC013592				
6/21/55 10:45 PM	6/22/55 8:00 AM	9:15:00	LPRSA0189571	ABC013591				
8/7/55 11:00 PM	8/8/55 2:15 AM	3:15:00	LPRSA0189570	ABC013590				
8/11/55 7:00 PM	8/12/55 3:15 PM	20:15:00	LPRSA0189569	ABC013589				
8/13/55 8:00 AM	8/13/55 12:30 PM	4:30:00	LPRSA0189569	ABC013589				
8/15/55 4:30 PM	8/16/55 8:30 AM	16:00:00	LPRSA0189568	ABC013588				
8/18/55 3:30 PM	8/19/55 2:30 AM	11:00:00	LPRSA0189567	ABC013587				
8/19/55 2:15 PM	8/20/55 8:50 AM	18:35:00	LPRSA0189567	ABC013587				
8/21/55 9:30 PM	8/22/55 8:45 AM	11:15:00	LPRSA0189566	ABC013586				
8/24/55 2:45 PM	8/25/55 8:45 AM	18:00:00	LPRSA0189565	ABC013585				
8/25/55 3:45 PM	8/26/55 8:45 AM	17:00:00	LPRSA0189564	ABC013584				
9/24/55 5:00 AM	9/26/55 8:00 AM	51:00:00	LPRSA0189563	ABC013583				
10/6/55 8:00 AM	10/6/55 12:30 PM	4:30:00	LPRSA0189562	ABC013582				
10/6/55 6:00 PM	10/7/55 9:45 AM	15:45:00	LPRSA0189562	ABC013582				
10/7/55 3:45 PM	10/10/55 7:30 AM	63:45:00	LPRSA0189562	ABC013582				
10/14/55 12:45 PM	10/16/55 8:40 PM	55:55:00	LPRSA0189561	ABC013581				
10/17/55 2:30 PM	10/19/55 9:30 AM	43:00:00	LPRSA0189561	ABC013581				
10/19/55 3:03 PM	10/20/55 4:00 PM	24:57:00	LPRSA0189561	ABC013581				
10/30/55 9:30 AM	10/30/55 1:30 PM	4:00:00	LPRSA0189560	ABC013580				
11/10/55 3:30 PM	11/11/55 3:30 AM	12:00:00	LPRSA0189559	ABC013579				
11/11/55 11:15 AM	11/12/55 8:15 AM	21:00:00	LPRSA0189559	ABC013579				
11/16/55 9:00 AM	11/16/55 2:00 PM	5:00:00	LPRSA0189558	ABC013578				
11/17/55 10:30 AM	11/18/55 9:30 AM	23:00:00	LPRSA0189558	ABC013578				
1/30/56 12:45 PM	1/31/56 7:30 AM	18:45:00	LPRSA0189556	ABC013576				
2/2/56 11:30 AM	2/3/56 7:30 AM	20:00:00	LPRSA0189555	ABC013575				
2/6/56 3:30 PM	2/7/56 8:15 AM	16:45:00	LPRSA0189554	ABC013574				
2/18/56 8:15 AM	2/18/56 3:15 PM	7:00:00	LPRSA0189553	ABC013573				
3/8/56 1:30 AM	3/9/56 8:15 AM	30:45:00	LPRSA0189552	ABC013572				
3/14/56 9:00 AM	3/15/56 8:30 AM	23:30:00	LPRSA0189551	ABC013571				
3/16/56 3:00 PM	3/17/56 9:30 AM	18:30:00	LPRSA0189550	ABC013570				
3/21/56 2:45 PM	3/22/56 9:45 AM	19:00:00	LPRSA0189549	ABC013569				
3/23/56 3:30 PM	3/25/56 9:00 AM	41:30:00	LPRSA0189548	ABC013568				
3/29/56 4:05 PM	3/30/56 8:50 AM	16:45:00	LPRSA0189547	ABC013567				
4/7/56 2:15 AM	4/7/56 9:15 AM	7:00:00	LPRSA0189546	ABC013566				
4/8/56 12:45 PM	4/9/56 9:00 AM	20:15:00	LPRSA0189546	ABC013566				
4/11/56 3:30 PM	4/12/56 8:05 AM	16:35:00	LPRSA0189545	ABC013565				
5/2/56 9:05 PM	5/3/56 8:45 AM	11:40:00	LPRSA0189544	ABC013564				
6/2/56 2:30 PM	6/3/56 11:40 AM	21:10:00	LPRSA0189543	ABC013563				

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Exhibit 2-4a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
6/27/56 3:20 PM	6/27/56 6:00 PM	2:40:00	LPRSA0189542	ABC013562				
7/16/56 2:15 PM	7/17/56 8:45 AM	18:30:00	LPRSA0189541	ABC013561				
7/21/56 9:10 AM	7/21/56 2:45 PM	5:35:00	LPRSA0189540	ABC013560				
7/27/56 9:30 AM	7/27/56 3:00 PM	5:30:00	LPRSA0189539	ABC013559				
8/6/56 4:15 PM	8/7/56 8:00 AM	15:45:00	LPRSA0189538	ABC013558				
8/21/56 4:00 AM	8/21/56 3:45 PM	11:45:00	LPRSA0189537	ABC013557				
9/6/56 6:00 PM	9/6/56 10:20 PM	4:20:00	LPRSA0189536	ABC013556				
9/7/56 9:30 AM	9/7/56 4:15 PM	6:45:00	LPRSA0189535	ABC013555				
10/22/56 9:30 PM	10/23/56 10:45 AM	13:15:00	LPRSA0189533	ABC013553				
10/23/56 12:00 PM	10/23/56 2:15 PM	2:15:00	LPRSA0189533	ABC013553				
10/31/56 11:30 AM	10/31/56 7:15 PM	7:45:00	LPRSA0189532	ABC013552				
11/1/56 10:00 AM	11/4/56 11:00 AM	73:00:00	LPRSA0189532	ABC013552				
11/18/56 2:00 AM	11/18/56 10:45 AM	8:45:00	LPRSA0189531	ABC013551				
11/22/56 12:15 AM	11/22/56 7:45 AM	7:30:00	LPRSA0189530	ABC013550				
12/9/56 2:45 PM	12/10/56 8:15 AM	17:30:00	LPRSA0189529	ABC013549				
12/14/56 8:00 AM	12/14/56 3:45 PM	7:45:00	LPRSA0189528	ABC013548				
12/22/56 10:00 PM	12/23/56 9:45 AM	11:45:00	LPRSA0189527	ABC013547				
1/23/57 3:30 AM	1/23/57 11:45 AM	8:15:00	LPRSA0189498	ABC013518				
2/9/57 1:45 PM	2/10/57 8:30 AM	18:45:00	LPRSA0189497	ABC013517				
2/26/57 3:30 PM	2/26/57 10:15 PM	6:45:00	LPRSA0189496	ABC013516				
3/1/57 3:00 PM	3/2/57 10:15 AM	19:15:00	LPRSA0189524	ABC013544				
3/8/57 9:15 AM	3/10/57 9:45 AM	48:30:00	LPRSA0189523	ABC013543				
3/15/57 8:15 PM	3/16/57 12:15 AM	4:00:00	LPRSA0189522	ABC013542				
3/19/57 9:15 PM	3/20/57 2:00 PM	16:45:00	LPRSA0189521	ABC013541				
4/2/57 7:30 AM	4/2/57 1:30 PM	6:00:00	LPRSA0189520	ABC013540				
4/4/57 8:55 PM	4/5/57 10:30 AM	13:35:00	LPRSA0189519	ABC013539				
4/5/57 2:00 PM	4/6/57 1:00 PM	23:00:00	LPRSA0189518	ABC013538				
4/8/57 3:50 PM	4/9/57 8:15 AM	16:25:00	LPRSA0189517	ABC013537				
4/9/57 8:45 AM	4/10/57 3:30 PM	30:45:00	LPRSA0189516	ABC013536				
4/10/57 8:45 AM	4/10/57 3:30 PM	6:45:00	LPRSA0189515	ABC013535				
4/11/57 8:00 AM	4/11/57 3:30 PM	7:30:00	LPRSA0189514	ABC013534				
4/12/57 8:00 AM	4/12/57 3:45 PM	7:45:00	LPRSA0189513	ABC013533				
4/18/57 9:45 PM	4/19/57 1:15 PM	15:30:00	LPRSA0189512	ABC013532				
4/23/57 6:40 AM	4/23/57 1:45 PM	7:05:00	LPRSA0189511	ABC013531				
4/25/57 3:45 PM	4/26/57 9:15 AM	17:30:00	LPRSA0189510	ABC013530				
4/29/57 1:00 PM	4/29/57 3:30 PM	2:30:00	LPRSA0189509	ABC013529				
5/14/57 8:45 PM	5/15/57 12:30 AM	3:45:00	LPRSA0189508	ABC013528				
* 5/16/57 12:00 AM	8/25/57 11:59 PM							
8/26/57 12:45 AM	8/26/57 9:00 AM	8:15:00	LPRSA0189507	ABC013527				
9/10/57 10:30 PM	9/11/57 8:30 AM	10:00:00	LPRSA0189506	ABC013526				
9/16/57 11:30 PM	9/17/57 9:00 AM	9:30:00	LPRSA0189505	ABC013525				
* 9/18/57 12:00 AM	12/19/57 11:59 PM							
12/20/57 2:45 PM	12/21/57 10:05 AM	19:20:00	LPRSA0189501	ABC013521				
12/26/57 11:00 AM	12/26/57 4:00 PM	5:00:00	LPRSA0189500	ABC013520				
12/26/57 4:40 PM	12/26/57 6:30 PM	1:50:00	LPRSA0189500	ABC013520				
1/14/58 2:00 PM	1/15/58 8:30 AM	18:30:00	LPRSA0189494	ABC013514				
1/21/58 9:15 PM	1/22/58 11:45 AM	14:30:00	LPRSA0189492	ABC013512				
1/22/58 4:00 PM	1/22/58 10:15 PM	6:15:00	LPRSA0189491	ABC013511				
1/24/58 4:30 PM	1/26/58 10:35 AM	42:05:00	LPRSA0189490	ABC013510				
2/7/58 2:30 PM	2/8/58 8:20 AM	17:50:00	LPRSA0189489	ABC013509				
2/27/58 11:00 AM	2/28/58 3:45 PM	28:45:00	LPRSA0189488	ABC013508				
3/3/58 9:15 PM	3/4/58 8:15 AM	11:00:00	LPRSA0189487	ABC013507				
3/14/58 2:30 PM	3/15/58 3:00 PM	24:30:00	LPRSA0189486	ABC013506				

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Exhibit 2-4a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
3/20/58 1:45 AM	3/22/58 9:00 AM	55:15:00	LPRSA0189485	ABC013505				
3/31/58 3:15 PM	3/31/58 10:35 PM	7:20:00	LPRSA0189484	ABC013504				
4/6/58 1:00 PM	4/7/58 9:00 PM	32:00:00	LPRSA0189483	ABC013503				
4/11/58 8:00 AM	4/12/58 10:30 AM	26:30:00	LPRSA0189482	ABC013502				
4/23/58 1:25 AM	4/23/58 4:40 AM	3:15:00	LPRSA0189481	ABC013501				
4/28/58 8:30 AM	4/28/58 3:45 PM	7:15:00	LPRSA0189480	ABC013500				
4/29/58 6:30 PM	4/30/58 8:00 AM	13:30:00	LPRSA0189479	ABC013499				
5/6/58 6:45 PM	5/7/58 4:35 AM	9:50:00	LPRSA0189478	ABC013498				
5/7/58 11:15 AM	5/7/58 6:00 PM	6:45:00	LPRSA0189478	ABC013498				
5/15/58 3:45 PM	5/15/58 5:10 PM	1:25:00	LPRSA0189477	ABC013497				
5/25/58 12:25 PM	5/26/58 5:25 PM	29:00:00	LPRSA0189476	ABC013496				
6/9/58 7:10 AM	6/9/58 8:00 AM	0:50:00	LPRSA0189475	ABC013495				
6/26/58 4:00 PM	6/27/58 5:45 AM	13:45:00	LPRSA0189474	ABC013494				
7/31/58 6:50 PM	8/1/58 8:15 AM	13:25:00	LPRSA0189473	ABC013493				
8/25/58 1:30 PM	8/26/58 8:00 AM	18:30:00	LPRSA0189472	ABC013492				
9/18/58 1:45 AM	9/18/58 8:30 AM	6:45:00	LPRSA0189471	ABC013491				
10/22/58 6:00 PM	10/23/58 6:10 PM	24:10:00	LPRSA0189469	ABC013489				
10/25/58 3:25 PM	10/27/58 6:00 AM	38:35:00	LPRSA0189468	ABC013488				
10/27/58 4:00 PM	10/28/58 2:25 AM	10:25:00	LPRSA0189467	ABC013487				
11/28/58 6:45 PM	11/29/58 9:40 AM	14:55:00	LPRSA0189466	ABC013486				
12/29/58 7:50 PM	12/30/58 4:15 AM	8:25:00	LPRSA0189465	ABC013485				
1/20/59 4:00 PM	1/21/59 8:00 AM	16:00:00	LPRSA0189463	ABC013483				
1/21/59 3:15 PM	1/22/59 4:35 AM	13:20:00	LPRSA0189462	ABC013482				
2/10/59 11:45 AM	2/10/59 11:55 PM	12:10:00	LPRSA0189461	ABC013481				
3/6/59 6:45 AM	3/7/59 9:15 AM	26:30:00	LPRSA0189458	ABC013478				
3/12/59 4:25 PM	3/13/59 7:00 AM	14:35:00	LPRSA0189459	ABC013479				
3/30/59 4:00 PM	3/31/59 9:00 AM	17:00:00	LPRSA0189460	ABC013480				
4/2/59 1:50 PM	4/3/59 8:00 AM	18:10:00	LPRSA0189457	ABC013477				
4/27/59 3:15 PM	4/28/59 8:30 AM	17:15:00	LPRSA0189456	ABC013476				
4/28/59 11:15 PM	4/29/59 8:25 AM	9:10:00	LPRSA0189455	ABC013475				
5/13/59 5:15 PM	5/13/59 8:45 PM	3:30:00	LPRSA0189438	ABC013458				
6/2/59 3:25 PM	6/3/59 7:30 AM	16:05:00	LPRSA0189454	ABC013474				
6/25/59 10:15 AM	6/25/59 12:30 PM	2:15:00	LPRSA0189453	ABC013473				
7/20/59 4:15 PM	7/20/59 5:15 PM	1:00:00	LPRSA0189452	ABC013472				
7/20/59 7:45 PM	7/20/59 11:20 PM	3:35:00	LPRSA0189452	ABC013472				
7/23/59 4:00 PM	7/23/59 6:35 PM	2:35:00	LPRSA0189451	ABC013471				
7/23/59 8:15 PM	7/23/59 11:05 PM	2:50:00	LPRSA0189451	ABC013471				
7/24/59 3:30 PM	7/24/59 5:45 PM	2:15:00	LPRSA0189450	ABC013470				
8/5/59 10:05 AM	8/6/59 8:00 AM	21:55:00	LPRSA0189448	ABC013468				
8/9/59 4:45 AM	8/9/59 12:00 PM	7:15:00	LPRSA0189447	ABC013467				
8/31/59 1:15 PM	9/1/59 8:45 AM	19:30:00	LPRSA0189445	ABC013465				
9/1/59 4:00 PM	9/1/59 11:40 PM	7:40:00	LPRSA0189445	ABC013465				
9/3/59 2:15 PM	9/3/59 11:10 PM	8:55:00	LPRSA0189444	ABC013464				
10/1/59 12:45 PM	10/1/59 3:30 PM	2:45:00	LPRSA0189443	ABC013463				
10/9/59 11:00 AM	10/10/59 1:45 PM	26:45:00	LPRSA0189440	ABC013460				
10/22/59 1:45 PM	10/22/59 6:05 PM	4:20:00	LPRSA0189436	ABC013456				
10/24/59 10:15 AM	10/25/59 10:30 AM	24:15:00	LPRSA0189435	ABC013455				
11/6/59 6:00 PM	11/7/59 5:00 PM	23:00:00	LPRSA0189434	ABC013454				
12/6/59 11:40 PM	12/8/59 8:45 AM	33:05:00	LPRSA0189431	ABC013451				
12/12/59 6:45 PM	12/13/59 9:00 AM	14:15:00	LPRSA0189430	ABC013450				
12/28/59 9:20 PM	12/29/59 1:15 PM	15:55:00	LPRSA0189429	ABC013449				
12/29/59 4:35 PM	12/30/59 8:15 AM	15:40:00	LPRSA0189428	ABC013448				
1/3/60 9:30 AM	1/4/60 8:10 AM	22:40:00	LPRSA0189427	ABC013447				

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Exhibit 2-4a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
1/13/60 11:15 AM	1/14/60 8:25 AM	21:10:00	LPRSA0189426	ABC013446				
1/15/60 12:45 AM	1/16/60 1:10 PM	36:25:00	LPRSA0189425	ABC013445				
1/18/60 10:30 PM	1/19/60 8:10 AM	9:40:00	LPRSA0189424	ABC013444				
2/6/60 6:00 AM	2/6/60 12:30 PM	6:30:00	LPRSA0189423	ABC013443				
2/11/60 5:30 AM	2/11/60 5:50 PM	12:20:00	LPRSA0189422	ABC013442				
2/18/60 8:30 PM	2/19/60 9:50 PM	25:20:00	LPRSA0189421	ABC013441				
2/25/60 10:30 PM	2/26/60 3:10 PM	16:40:00	LPRSA0189420	ABC013440				
3/3/60 5:50 PM	3/4/60 9:30 AM	15:40:00	LPRSA0189419	ABC013439				
3/17/60 1:40 PM	3/17/60 11:20 PM	9:40:00	LPRSA0189418	ABC013438				
3/31/60 2:55 PM	4/1/60 8:10 AM	17:15:00	LPRSA0189417	ABC013437				
4/3/60 9:20 PM	4/4/60 10:55 AM	13:35:00	LPRSA0189416	ABC013436				
4/4/60 10:20 PM	4/6/60 9:40 AM	35:20:00	LPRSA0189415	ABC013435				
4/7/60 11:30 AM	4/8/60 4:25 PM	28:55:00	LPRSA0189414	ABC013434				
4/11/60 11:20 PM	4/12/60 8:02 AM	8:42:00	LPRSA0189413	ABC013433				
4/18/60 10:14 AM	4/18/60 5:30 PM	7:16:00	LPRSA0189412	ABC013432				
4/26/60 9:00 PM	4/27/60 12:00 PM	15:00:00	LPRSA0189411	ABC013431				
5/9/60 8:00 AM	5/9/60 5:55 PM	9:55:00	LPRSA0189410	ABC013430				
5/12/60 7:30 PM	5/13/60 5:30 PM	22:00:00	LPRSA0189409	ABC013429				
5/23/60 12:40 PM	5/24/60 8:45 AM	20:05:00	LPRSA0189408	ABC013428				
6/3/60 5:45 PM	6/4/60 8:00 PM	26:15:00	LPRSA0189407	ABC013427				
7/1/60 6:10 PM	7/1/60 9:20 PM	3:10:00	LPRSA0189406	ABC013426				
7/12/60 8:50 PM	7/13/60 8:20 AM	11:30:00	LPRSA0189405	ABC013425				
7/14/60 12:50 PM	7/14/60 9:20 PM	8:30:00	LPRSA0189404	ABC013424				
7/27/60 1:20 PM	7/28/60 8:20 AM	19:00:00	LPRSA0189403	ABC013423				
7/30/60 9:00 AM	7/31/60 8:15 AM	23:15:00	LPRSA0189402	ABC013422				
8/10/60 8:20 AM	8/10/60 12:22 PM	4:02:00	LPRSA0189401	ABC013421				
8/10/60 9:30 PM	8/11/60 8:10 AM	10:40:00	LPRSA0189400	ABC013420				
8/19/60 7:20 AM	8/20/60 9:00 AM	25:40:00	LPRSA0189399	ABC013419				
8/30/60 6:25 PM	8/30/60 8:15 PM	1:50:00	LPRSA0189398	ABC013418				
8/31/60 7:15 PM	9/1/60 8:15 AM	13:00:00	LPRSA0189398	ABC013418				
9/11/60 11:00 PM	9/13/60 8:15 AM	33:15:00	LPRSA0189397	ABC013417				
9/19/60 10:25 AM	9/19/60 4:30 PM	6:05:00	LPRSA0189396	ABC013416				
10/20/60 6:45 AM	10/20/60 6:05 PM	11:20:00	LPRSA0189395	ABC013415				
11/10/60 7:15 AM	11/10/60 6:15 PM	11:00:00	LPRSA0189394	ABC013414				
11/29/60 3:55 PM	11/29/60 11:30 PM	7:35:00	LPRSA0189393	ABC013413				
12/12/60 11:20 AM	12/13/60 10:15 AM	22:55:00	LPRSA0189392	ABC013412				
12/21/60 7:35 AM	12/21/60 9:35 PM	14:00:00	LPRSA0189391	ABC013411				
1/1/61 9:00 AM	1/2/61 8:10 AM	23:10:00	LPRSA0189389	ABC013409				
2/20/61 3:40 PM	2/20/61 9:50 PM	6:10:00	LPRSA0189388	ABC013408				
2/22/61 11:30 PM	2/24/61 8:30 AM	33:00:00	LPRSA0189387	ABC013407				
2/24/61 3:15 PM	2/27/61 8:15 AM	65:00:00	LPRSA0189386	ABC013406				
2/28/61 3:30 PM	2/28/61 10:30 PM	7:00:00	LPRSA0189385	ABC013405				
3/1/61 4:00 PM	3/2/61 8:05 AM	16:05:00	LPRSA0189378	ABC013398				
3/6/61 12:00 PM	3/7/61 8:10 AM	20:10:00	LPRSA0189379	ABC013399				
3/8/61 12:15 PM	3/9/61 8:25 AM	20:10:00	LPRSA0189380	ABC013400				
3/9/61 12:30 PM	3/10/61 11:55 AM	23:25:00	LPRSA0189381	ABC013401				
3/13/61 10:30 PM	3/15/61 8:15 AM	33:45:00	LPRSA0189382	ABC013402				
3/23/61 11:00 AM	3/24/61 12:30 PM	25:30:00	LPRSA0189383	ABC013403				
3/28/61 11:20 PM	3/29/61 8:10 AM	8:50:00	LPRSA0189384	ABC013404				
4/1/61 12:05 PM	4/2/61 9:15 AM	21:10:00	LPRSA0189377	ABC013397				
4/10/61 8:15 AM	4/10/61 3:30 PM	7:15:00	LPRSA0189376	ABC013396				
4/12/61 10:15 PM	4/13/61 11:05 PM	24:50:00	LPRSA0189375	ABC013395				
4/14/61 3:00 PM	4/14/61 4:00 PM	1:00:00	LPRSA0189374	ABC013394				
4/16/61 11:20 AM	4/17/61 8:00 AM	20:40:00	LPRSA0189373	ABC013393				

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Exhibit 2-4a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source	Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
4/17/61 3:05 PM	4/17/61 10:50 PM	7:45:00	LPRSA0189372	ABC013392				
4/18/61 8:05 AM	4/18/61 11:05 PM	15:00:00	LPRSA0189371	ABC013391				
4/24/61 8:30 AM	4/25/61 8:10 AM	23:40:00	LPRSA0189370	ABC013390				
4/25/61 4:55 PM	4/28/61 8:30 AM	63:35:00	LPRSA0189368	ABC013388				
4/28/61 8:10 PM	4/29/61 10:30 AM	14:20:00	LPRSA0189367	ABC013387				
5/16/61 1:15 PM	5/16/61 9:55 PM	8:40:00	LPRSA0189365	ABC013385				
5/26/61 3:15 PM	5/26/61 9:20 PM	6:05:00	LPRSA0189364	ABC013384				
6/14/61 3:35 PM	6/14/61 7:40 PM	4:05:00	LPRSA0189362	ABC013382				
6/14/61 11:40 PM	6/15/61 8:20 AM	8:40:00	LPRSA0189361	ABC013381				
6/20/61 8:55 PM	6/21/61 11:30 PM	26:35:00	LPRSA0189360	ABC013380				
7/15/61 7:45 PM	7/17/61 8:20 AM	36:35:00	LPRSA0189358	ABC013378				
7/20/61 7:30 AM	7/20/61 3:45 PM	8:15:00	LPRSA0189357	ABC013377				
7/24/61 3:45 PM	7/25/61 8:20 AM	16:35:00	LPRSA0189356	ABC013376				
7/31/61 7:00 PM	8/1/61 8:45 AM	13:45:00	LPRSA0189355	ABC013375				
8/3/61 10:50 AM	8/3/61 3:35 PM	4:45:00	LPRSA0189354	ABC013374				
8/21/61 2:10 PM	8/22/61 8:00 AM	17:50:00	LPRSA0189353	ABC013373				
8/23/61 10:20 AM	8/24/61 8:20 AM	22:00:00	LPRSA0189352	ABC013372				
8/24/61 1:10 PM	8/24/61 3:35 PM	2:25:00	LPRSA0189351	ABC013371				
9/15/61 9:30 AM	9/15/61 8:45 PM	11:15:00	LPRSA0189349	ABC013369				
9/19/61 8:00 PM	9/21/61 6:30 PM	46:30:00	LPRSA0189348	ABC013368				
10/3/61 6:50 AM	10/4/61 11:15 AM	28:25:00	LPRSA0189347	ABC013367				
10/4/61 9:15 PM	10/6/61 12:05 PM	38:50:00	LPRSA0189346	ABC013366				
10/30/61 5:20 PM	10/30/61 11:25 PM	6:05:00	LPRSA0189344	ABC013364				
11/14/61 12:55 PM	11/14/61 11:15 PM	10:20:00	LPRSA0189343	ABC013363				
11/16/61 7:10 PM	11/17/61 8:20 AM	13:10:00	LPRSA0189342	ABC013362				
11/24/61 9:00 AM	11/25/61 8:30 AM	23:30:00	LPRSA0189341	ABC013361				
12/12/61 9:20 AM	12/13/61 9:25 AM	24:05:00	LPRSA0189339	ABC013359				
12/18/61 8:30 AM	12/18/61 11:15 PM	14:45:00	LPRSA0189338	ABC013358				
12/28/61 9:55 AM	12/28/61 11:00 PM	13:05:00	LPRSA0189337	ABC013357				
1/6/62 11:20 AM	1/7/62 9:40 AM	22:20:00	LPRSA0189336	ABC013356				
1/15/62 3:15 PM	1/15/62 9:00 PM	5:45:00	LPRSA0189335	ABC013355				
2/5/62 6:20 PM	2/6/62 8:25 AM	14:05:00	LPRSA0189333	ABC013353				
2/14/62 12:30 PM	2/14/62 8:55 PM	8:25:00	LPRSA0189332	ABC013352				
2/19/62 2:10 PM	2/20/62 7:00 AM	16:50:00	LPRSA0189331	ABC013351				
2/24/62 5:40 AM	2/25/62 11:10 AM	29:30:00	LPRSA0189330	ABC013350				
2/26/62 10:45 AM	3/1/62 8:00 AM	69:15:00	LPRSA0189329	ABC013349				
3/6/62 10:25 AM	3/7/62 8:15 AM	21:50:00	LPRSA0189328	ABC013348				
3/12/62 6:18 AM	3/13/62 10:45 PM	40:27:00	LPRSA0189327	ABC013347				
3/21/62 2:55 PM	3/22/62 8:15 AM	17:20:00	LPRSA0189326	ABC013346				
4/1/62 5:30 AM	4/2/62 9:00 AM	27:30:00	LPRSA0189325	ABC013345				
4/7/62 2:00 PM	4/9/62 8:15 AM	42:15:00	LPRSA0189324	ABC013344				
4/9/62 3:30 PM	4/10/62 8:10 AM	16:40:00	LPRSA0189323	ABC013343				
4/11/62 10:35 PM	4/12/62 7:05 AM	8:30:00	LPRSA0189322	ABC013342				
4/12/62 9:35 PM	4/13/62 11:30 PM	25:55:00	LPRSA0189321	ABC013341				
4/27/62 6:40 PM	4/28/62 3:00 AM	8:20:00	LPRSA0189320	ABC013340				
4/30/62 3:50 PM	5/1/62 8:00 AM	16:10:00	LPRSA0189311	ABC013331				
5/3/62 12:20 AM	5/3/62 7:10 AM	6:50:00	LPRSA0189319	ABC013339				
5/8/62 10:30 PM	5/9/62 8:10 AM	9:40:00	LPRSA0189318	ABC013338				
5/24/62 9:40 PM	5/25/62 8:20 AM	10:40:00	LPRSA0189317	ABC013337				
5/31/62 10:35 PM	6/1/62 7:03 AM	8:28:00	LPRSA0189316	ABC013336				
6/5/62 6:40 PM	6/6/62 8:15 AM	13:35:00	LPRSA0189315	ABC013335				
6/13/62 12:00 AM	6/14/62 3:30 PM	39:30:00	LPRSA0189314	ABC013334				
6/19/62 10:50 PM	6/20/62 8:10 AM	9:20:00	LPRSA0189313	ABC013333				
6/26/62 4:15 PM	6/27/62 8:15 AM	16:00:00	LPRSA0189312	ABC013332				

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Exhibit 2-4a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
7/18/62 1:30 PM	7/18/62 4:55 PM	3:25:00	LPRSA0189310 ABC013330				
7/23/62 5:15 PM	7/24/62 8:20 AM	15:05:00	LPRSA0189309 ABC013329				
8/7/62 1:30 PM	8/8/62 8:15 AM	18:45:00	LPRSA0189308 ABC013328				
8/9/62 1:10 PM	8/10/62 8:55 AM	19:45:00	LPRSA0189307 ABC013327				
8/10/62 3:45 PM	8/11/62 12:45 PM	21:00:00	LPRSA0189306 ABC013326				
8/17/62 5:15 PM	8/18/62 9:20 AM	16:05:00	LPRSA0189305 ABC013325				
8/21/62 4:04 AM	8/21/62 2:40 PM	10:36:00	LPRSA0189304 ABC013324				
8/28/62 5:00 AM	8/29/62 3:15 PM	34:15:00	LPRSA0189303 ABC013323				
8/29/62 4:05 PM	8/29/62 9:30 PM	5:25:00	LPRSA0189302 ABC013322				
9/5/62 9:15 AM	9/5/62 11:00 PM	13:45:00	LPRSA0189301 ABC013321				
9/14/62 4:15 PM	9/14/62 6:25 PM	2:10:00	LPRSA0189300 ABC013320				
9/17/62 4:00 PM	9/18/62 8:10 AM	16:10:00	LPRSA0189299 ABC013319				
9/19/62 6:00 PM	9/20/62 2:05 PM	20:05:00	LPRSA0189298 ABC013318				
9/25/62 11:15 PM	9/26/62 10:45 AM	11:30:00	LPRSA0189297 ABC013317				
9/26/62 11:00 PM	9/28/62 7:50 PM	44:50:00	LPRSA0189296 ABC013316				
10/4/62 10:25 PM	10/7/62 9:25 AM	59:00:00	LPRSA0189295 ABC013315				
10/9/62 9:40 AM	10/10/62 12:50 PM	27:10:00	LPRSA0189294 ABC013314				
10/11/62 11:10 PM	10/12/62 8:30 AM	9:20:00	LPRSA0189293 ABC013313				
10/17/62 8:08 AM	10/17/62 12:15 PM	4:07:00	LPRSA0189292 ABC013312				
10/23/62 10:55 AM	10/24/62 8:30 AM	21:35:00	LPRSA0189291 ABC013311				
10/25/62 8:15 PM	10/26/62 11:05 PM	26:50:00	LPRSA0189290 ABC013310				
10/30/62 12:30 PM	11/2/62 1:35 PM	73:05:00	LPRSA0189289 ABC013309				
11/3/62 9:55 AM	11/5/62 8:00 AM	46:05:00	LPRSA0189288 ABC013308				
11/9/62 4:25 PM	11/11/62 10:00 AM	41:35:00	LPRSA0189287 ABC013307				
11/13/62 3:00 PM	11/14/62 8:10 AM	17:10:00	LPRSA0189286 ABC013306				
11/18/62 10:15 PM	11/19/62 9:30 PM	23:15:00	LPRSA0189285 ABC013305				
11/21/62 8:15 PM	11/23/62 9:00 AM	36:45:00	LPRSA0189284 ABC013304				
12/5/62 8:15 AM	12/8/62 11:15 AM	75:00:00	LPRSA0189283 ABC013303				
12/22/62 11:30 AM	12/24/62 9:00 AM	45:30:00	LPRSA0189282 ABC013302				
12/26/62 1:30 PM	12/27/62 11:55 AM	22:25:00	LPRSA0189281 ABC013301				
12/29/62 3:30 PM	12/30/62 11:50 AM	20:20:00	LPRSA0189280 ABC013300				
* 1/1/63 12:00 AM	10/14/74 11:59 PM						
* 9/28/75 12:00 AM	12/31/16 11:59 PM						
Subtotal		13691:59:00					

* Missing data.

Source: PVSC throw-out logs.

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Exhibit 2-4a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
(1974-1975)							
10/15/74	10/16/74	42:45:00	LPRSA0232953	21.8	38.83	217	70,322
11/12/74	11/13/74	5:50:00	LPRSA0232953	25.0	6.08	217	11,004
12/1/74	12/2/74	15:13:00	LPRSA0232953	22.0	13.95	217	25,260
12/7/74	12/8/74	18:45:00	LPRSA0232953	25.9	20.23	217	36,643
12/16/74	12/16/74	20:55:00	LPRSA0232953	23.8	20.74	217	37,563
1/6/75	1/7/75	3:25:00	LPRSA0232953	19.5	2.78	217	5,027
1/8/75	1/9/75	12:55:00	LPRSA0232953	19.0	10.23	217	18,518
1/13/75	1/13/75	22:40:00	LPRSA0232953	20.0	18.89	217	34,207
1/18/75	1/18/75	14:45:00	LPRSA0232953	20.5	12.60	217	22,816
1/19/75	1/20/75	10:11:00	LPRSA0232953	25.0	10.61	217	19,210
1/29/75	1/29/75	22:00:00	LPRSA0232953	21.0	19.25	217	34,861
1/31/75	2/2/75	49:20:00	LPRSA0232953	22.3	45.84	217	83,012
2/17/75	2/18/75	4:45:00	LPRSA0232953	21.5	4.26	217	7,706
2/24/75	2/24/75	24:45:00	LPRSA0232953	27.4	28.26	217	51,171
3/12/75	3/12/75	14:30:00	LPRSA0232953	24.1	14.56	217	26,368
3/19/75	3/20/75	19:55:00	LPRSA0232953	28.7	23.82	217	43,131
4/3/75	4/3/75	12:50:00	LPRSA0232953	22.5	12.03	217	21,788
4/23/75	4/24/75	4:15:00	LPRSA0232954	12.0	2.13	217	3,848
4/24/75	4/25/75	9:00:00	LPRSA0232954	17.6	6.60	217	11,952
4/25/75	4/26/75	8:50:00	LPRSA0232954	16.2	5.96	217	10,798
5/4/75	5/5/75	13:10:00	LPRSA0232954	20.7	11.36	217	20,566
5/13/75	5/13/75	4:45:00	LPRSA0232954	27.0	5.34	217	9,677
6/1/75	6/1/75	6:05:00	LPRSA0232954	19.0	4.82	217	8,721
6/5/75	6/6/75	12:20:00	LPRSA0232954	20.5	10.53	217	19,078
6/6/75	6/6/75	8:45:00	LPRSA0232954	26.3	9.59	217	17,364
6/12/75	6/13/75	22:21:00	LPRSA0232954	22.0	20.49	217	37,102
6/28/75	6/28/75	2:00:00	LPRSA0232954	24.0	2.00	217	3,622
7/7/75	7/7/75	13:05:00	LPRSA0232954	23.0	12.54	217	22,706
7/9/75	7/9/75	4:30:00	LPRSA0232954	22.0	4.13	217	7,470
7/13/75	7/13/75	13:25:00	LPRSA0232954	33.0	18.45	217	33,408
7/14/75	7/14/75	12:15:00	LPRSA0232954	21.5	10.97	217	19,873
7/15/75	7/15/75	9:35:00	LPRSA0232954	20.0	7.99	217	14,462
7/20/75	7/21/75	13:25:00	LPRSA0232954	24.0	13.42	217	24,297
7/24/75	7/25/75	13:25:00	LPRSA0232954	35.3	19.73	217	35,737
8/24/75	8/25/75	7:35:00	LPRSA0232954	21.0	6.64	217	12,016
9/22/75	9/27/75	102:25:00	LPRSA0232955	30.1	128.45	217	232,612

Subtotal **596:40:00** **604.06** **1,093,920**

Estimated Mass/Bypass Time (lb/hr) **1,833**

Estimated Bypassed Volume Rate (MG/hr) **1.012**

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

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**Exhibit 2-4b. Documented PVSC Bypasses at Verona Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1950-1962)

*	8/2/24 12:00 PM	10/3/50 11:59 PM	LPRSA0198629				
	10/4/50 10:00 PM	10/5/50 11:30 AM	13:30:00 LPRSA0188654	ABC012674			
	10/10/50 2:30 AM	10/10/50 8:30 AM	6:00:00 LPRSA0188652	ABC012672			
	10/12/50 1:30 PM	10/13/50 9:30 AM	20:00:00 LPRSA0188650	ABC012670			
	10/23/50 1:30 PM	10/24/50 9:00 AM	19:30:00 LPRSA0188648	ABC012668			
	11/20/50 6:00 PM	11/21/50 9:00 AM	15:00:00 LPRSA0188646	ABC012666			
	11/25/50 9:00 AM	11/25/50 1:00 PM	4:00:00 LPRSA0188643	ABC012663			
	12/4/50 12:30 PM	12/4/50 9:00 PM	8:30:00 LPRSA0188641	ABC012661			
	12/7/50 4:00 PM	12/8/50 11:30 AM	19:30:00 LPRSA0188637	ABC012657			
	12/15/50 10:30 PM	12/16/50 9:00 AM	10:30:00 LPRSA0188639	ABC012659			
	12/29/50 12:30 PM	12/30/50 11:30 AM	23:00:00 LPRSA0188635	ABC012655			
	1/7/51 5:00 PM	1/8/51 9:00 AM	16:00:00 LPRSA0188633	ABC012653			
	1/11/51 5:30 PM	1/12/51 8:30 AM	15:00:00 LPRSA0188619	ABC012639			
	1/14/51 6:00 PM	1/15/51 12:00 PM	18:00:00 LPRSA0188631	ABC012651			
	1/23/51 2:00 AM	1/24/51 2:00 PM	36:00:00 LPRSA0188621	ABC012641			
	1/25/51 4:00 PM	1/25/51 7:00 PM	3:00:00 LPRSA0188623	ABC012643			
	1/28/51 5:00 PM	1/29/51 8:30 AM	15:30:00 LPRSA0188625	ABC012645			
	1/29/51 7:30 PM	1/30/51 10:00 AM	14:30:00 LPRSA0188625	ABC012645			
	1/31/51 4:00 PM	2/1/51 3:00 PM	23:00:00 LPRSA0188628	ABC012648			
	2/7/51 11:00 AM	2/7/51 7:30 PM	8:30:00 LPRSA0188585	ABC012605			
	2/10/51 5:30 AM	2/10/51 12:00 PM	6:30:00 LPRSA0188588	ABC012608			
	2/11/51 6:00 PM	2/13/51 9:30 AM	39:30:00 LPRSA0188588	ABC012608			
	2/13/51 7:45 PM	2/14/51 10:00 AM	14:15:00 LPRSA0188588	ABC012608			
	2/14/51 5:45 PM	2/15/51 9:30 AM	15:45:00 LPRSA0188588	ABC012608			
	2/17/51 4:00 AM	2/17/51 10:00 PM	18:00:00 LPRSA0188588	ABC012608			
	2/19/51 5:00 PM	2/20/51 9:30 AM	16:30:00 LPRSA0188596	ABC012616			
	2/20/51 4:00 PM	2/21/51 5:30 PM	25:30:00 LPRSA0188596	ABC012616			
	2/22/51 10:30 AM	2/22/51 11:45 AM	1:15:00 LPRSA0188596	ABC012616			
	2/23/51 8:30 AM	2/23/51 10:00 AM	1:30:00 LPRSA0188596	ABC012616			
	3/1/51 2:30 PM	3/2/51 10:00 AM	19:30:00 LPRSA0188604	ABC012624			
	3/3/51 3:00 PM	3/5/51 10:30 AM	43:30:00 LPRSA0188606	ABC012626			
	3/13/51 4:30 PM	3/15/51 9:30 AM	41:00:00 LPRSA0188609	ABC012629			
	3/16/51 4:00 PM	3/19/51 9:30 AM	65:30:00 LPRSA0188612	ABC012632			
	3/19/51 5:00 PM	3/20/51 12:00 PM	19:00:00 LPRSA0188616	ABC012636			
*	3/22/51 12:00 AM	12/31/51 11:59 PM					
	2/17/52 3:30 AM	2/18/52 9:00 AM	29:30:00 LPRSA0189755	ABC013775			
	2/20/52 6:00 PM	2/21/52 9:00 AM	15:00:00 LPRSA0189754	ABC013774			
	2/29/52 9:00 PM	3/1/52 9:30 AM	12:30:00 LPRSA0189753	ABC013773			
	3/3/52 5:30 PM	3/5/52 2:30 PM	45:00:00 LPRSA0189753	ABC013773			
	3/11/52 5:00 AM	3/17/52 2:00 PM	153:00:00 LPRSA0189752	ABC013772			
	3/19/52 10:30 AM	3/19/52 7:00 PM	8:30:00 LPRSA0189751	ABC013771			
	3/22/52 5:00 PM	3/24/52 9:30 AM	40:30:00 LPRSA0189750	ABC013770			
	3/24/52 6:15 PM	3/25/52 9:30 AM	15:15:00 LPRSA0189750	ABC013770			
	4/4/52 4:45 PM	4/6/52 9:00 AM	40:15:00 LPRSA0189749	ABC013769			
	4/14/52 1:15 AM	4/14/52 10:30 AM	9:15:00 LPRSA0189748	ABC013768			
	4/14/52 2:30 PM	4/15/52 1:00 PM	22:30:00 LPRSA0189748	ABC013768			
	4/23/52 4:30 PM	4/24/52 9:00 AM	16:30:00 LPRSA0189747	ABC013767			
	4/25/52 9:00 AM	4/25/52 7:15 PM	10:15:00 LPRSA0189744	ABC013764			
	4/26/52 10:30 AM	4/28/52 4:00 PM	53:30:00 LPRSA0189744	ABC013764			
	4/29/52 3:45 PM	5/3/52 9:30 AM	89:45:00 LPRSA0189745	ABC013765			
	5/5/52 9:30 AM	5/5/52 4:45 PM	7:15:00 LPRSA0189745	ABC013765			

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**Exhibit 2-4b. Documented PVSC Bypasses at Verona Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
5/6/52 3:15 PM	5/6/52 10:00 PM	6:45:00	LPRSA0189745 ABC013765				
5/11/52 10:00 PM	5/12/52 4:00 PM	18:00:00	LPRSA0189743 ABC013763				
5/13/52 2:30 PM	5/14/52 8:30 AM	18:00:00	LPRSA0189743 ABC013763				
5/18/52 7:15 AM	5/19/52 9:30 AM	26:15:00	LPRSA0189741 ABC013761				
5/19/52 6:30 PM	5/20/52 2:45 PM	20:15:00	LPRSA0189741 ABC013761				
5/21/52 3:30 PM	5/22/52 9:30 AM	18:00:00	LPRSA0189741 ABC013761				
5/22/52 4:00 PM	5/23/52 1:45 PM	21:45:00	LPRSA0189742 ABC013762				
5/25/52 8:45 AM	5/25/52 1:45 PM	5:00:00	LPRSA0189740 ABC013760				
5/26/52 10:15 AM	5/27/52 8:30 AM	22:15:00	LPRSA0189740 ABC013760				
6/2/52 2:45 PM	6/3/52 9:30 AM	18:45:00	LPRSA0189738 ABC013758				
6/9/52 8:30 AM	6/10/52 5:00 PM	32:30:00	LPRSA0189736 ABC013756				
6/11/52 2:00 PM	6/11/52 5:00 PM	3:00:00	LPRSA0189737 ABC013757				
6/17/52 4:40 PM	6/17/52 8:50 PM	4:10:00	LPRSA0189735 ABC013755				
6/19/52 4:00 PM	6/20/52 10:30 AM	18:30:00	LPRSA0189734 ABC013754				
6/27/52 3:40 PM	6/28/52 8:10 AM	16:30:00	LPRSA0189729 ABC013749				
6/29/52 12:15 AM	6/30/52 9:15 AM	33:00:00	LPRSA0189728 ABC013748				
7/8/52 3:45 PM	7/10/52 9:15 AM	41:30:00	LPRSA0189730 ABC013750				
7/21/52 3:45 PM	7/22/52 9:45 AM	18:00:00	LPRSA0189725 ABC013745				
7/31/52 4:15 PM	8/1/52 9:15 AM	17:00:00	LPRSA0189724 ABC013744				
8/2/52 3:40 PM	8/3/52 8:45 AM	17:05:00	LPRSA0189725 ABC013745				
8/6/52 2:15 PM	8/6/52 7:45 PM	5:30:00	LPRSA0189715 ABC013735				
8/8/52 1:15 PM	8/9/52 2:15 PM	25:00:00	LPRSA0189715 ABC013735				
8/10/52 8:45 AM	8/11/52 8:15 AM	23:30:00	LPRSA0189716 ABC013736				
8/11/52 4:45 PM	8/12/52 8:15 AM	15:30:00	LPRSA0189719 ABC013739				
8/12/52 4:15 PM	8/13/52 8:15 AM	16:00:00	LPRSA0189721 ABC013741				
8/13/52 4:45 PM	8/14/52 8:15 AM	15:30:00	LPRSA0189720 ABC013742				
8/15/52 4:15 PM	8/17/52 8:15 AM	40:00:00	LPRSA0189714 ABC013734				
8/21/52 3:45 PM	8/22/52 9:15 AM	17:30:00	LPRSA0189713 ABC013733				
8/30/52 9:15 AM	9/2/52 8:15 AM	71:00:00	LPRSA0189712 ABC013732				
9/2/52 4:15 PM	9/3/52 1:15 PM	21:00:00	LPRSA0189711 ABC013731				
9/15/52 3:15 PM	9/17/52 4:15 PM	49:00:00	LPRSA0189709 ABC013729				
9/18/52 12:15 PM	9/20/52 8:15 AM	44:00:00	LPRSA0189710 ABC013730				
9/23/52 9:45 AM	9/23/52 1:15 PM	3:30:00	LPRSA0189708 ABC013728				
10/2/52 6:15 PM	10/2/52 10:00 PM	3:45:00	LPRSA0189707 ABC013727				
10/28/52 4:45 PM	10/29/52 8:15 AM	15:30:00	LPRSA0189706 ABC013726				
11/2/52 8:30 AM	11/2/52 1:30 PM	5:00:00	LPRSA0189705 ABC013725				
11/3/52 1:15 PM	11/4/52 8:15 AM	19:00:00	LPRSA0189703 ABC013723				
11/10/52 3:45 PM	11/11/52 8:15 AM	16:30:00	LPRSA0189704 ABC013724				
12/2/52 1:15 PM	12/5/52 5:15 PM	76:00:00	LPRSA0189702 ABC013722				
12/9/52 10:45 AM	1/18/53 4:30 PM	965:45:00	LPRSA0189655 ABC013675				
1/21/53 2:15 PM	1/22/53 8:15 AM	18:00:00	LPRSA0189656 ABC013676				
1/24/53 9:15 AM	1/24/53 3:15 PM	6:00:00	LPRSA0189657 ABC013677				
2/11/53 4:45 PM	2/13/53 9:45 AM	41:00:00	LPRSA0189658 ABC013678				
2/15/53 10:15 AM	2/15/53 3:45 PM	5:30:00	LPRSA0189659 ABC013679				
2/21/53 8:15 AM	2/22/53 8:30 PM	36:15:00	LPRSA0189660 ABC013680				
2/25/53 8:15 AM	3/10/53 6:45 PM	322:30:00	LPRSA0189661 ABC013681				
3/15/53 12:15 AM	3/23/53 1:15 PM	205:00:00	LPRSA0189664 ABC013684				
3/24/53 9:00 AM	3/25/53 7:45 PM	34:45:00	LPRSA0189664 ABC013684				
3/30/53 2:15 PM	3/31/53 9:30 AM	19:15:00	LPRSA0189664 ABC013684				
5/5/53 4:30 PM	5/6/53 11:30 AM	19:00:00	LPRSA0189664 ABC013684				
5/8/53 10:00 AM	5/9/53 9:15 AM	23:15:00	LPRSA0189664 ABC013684				
5/13/53 9:45 AM	5/14/53 9:30 AM	23:45:00	LPRSA0189664 ABC013684				
5/14/53 3:00 PM	5/15/53 11:30 AM	20:30:00	LPRSA0189664 ABC013684				
5/24/53 12:00 PM	5/25/53 10:00 AM	22:00:00	LPRSA0189664 ABC013684				

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**Exhibit 2-4b. Documented PVSC Bypasses at Verona Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
7/6/53 7:45 PM	7/7/53 8:15 AM	12:30:00	LPRSA0189681 ABC013701				
7/20/53 9:10 PM	7/21/53 8:30 AM	11:20:00	LPRSA0189682 ABC013702				
10/27/53 4:30 PM	10/28/53 2:15 PM	21:45:00	LPRSA0189692 ABC013712				
10/29/53 1:45 PM	10/29/53 4:00 PM	2:15:00	LPRSA0189693 ABC013713				
11/7/53 6:45 AM	11/8/53 2:15 PM	31:30:00	LPRSA0189695 ABC013715				
12/6/53 11:30 AM	12/7/53 8:20 AM	20:50:00	LPRSA0189650 ABC013670				
12/14/53 5:45 AM	12/14/53 12:15 PM	6:30:00	LPRSA0189647 ABC013667				
12/28/53 4:30 PM	12/29/53 9:15 AM	16:45:00	LPRSA0189646 ABC013666				
1/14/54 4:15 PM	1/18/54 9:15 AM	89:00:00	LPRSA0189592 ABC013612				
1/18/54 2:15 PM	1/21/54 9:30 AM	67:15:00	LPRSA0189591 ABC013611				
1/22/54 3:15 PM	1/25/54 9:30 AM	66:15:00	LPRSA0189590 ABC013610				
1/25/54 2:15 PM	2/2/54 9:45 AM	187:30:00	LPRSA0189590 ABC013610				
2/3/54 1:00 PM	2/4/54 9:00 AM	20:00:00	LPRSA0189589 ABC013609				
2/8/54 5:15 PM	2/9/54 9:15 AM	16:00:00	LPRSA0189588 ABC013608				
2/16/54 4:45 PM	2/17/54 1:30 PM	20:45:00	LPRSA0189587 ABC013607				
2/21/54 5:00 PM	2/22/54 8:30 AM	15:30:00	LPRSA0189586 ABC013606				
2/23/54 11:45 AM	2/24/54 1:00 PM	25:15:00	LPRSA0189621 ABC013641				
3/19/54 4:15 PM	3/20/54 2:30 PM	22:15:00	LPRSA0189617 ABC013637				
4/13/54 12:15 PM	4/13/54 3:30 PM	3:15:00	LPRSA0189623 ABC013643				
4/16/54 1:00 PM	4/18/54 10:00 AM	45:00:00	LPRSA0189632 ABC013652				
4/23/54 1:15 PM	4/25/54 9:15 AM	44:00:00	LPRSA0189614 ABC013634				
5/7/54 10:30 AM	5/14/54 4:00 PM	173:30:00	LPRSA0189631 ABC013651				
6/3/54 4:45 PM	6/9/54 9:30 AM	136:45:00	LPRSA0189630 ABC013650				
7/7/54 4:15 PM	7/8/54 9:15 AM	17:00:00	LPRSA0189624 ABC013644				
8/3/54 9:00 AM	8/4/54 9:00 AM	24:00:00	LPRSA0189620 ABC013640				
8/9/54 8:45 AM	8/9/54 1:45 PM	5:00:00	LPRSA0189622 ABC013642				
8/20/54 4:15 PM	8/22/54 8:15 AM	40:00:00	LPRSA0189610 ABC013630				
8/25/54 4:30 PM	8/26/54 9:00 AM	16:30:00	LPRSA0189609 ABC013629				
8/30/54 4:30 PM	9/1/54 9:15 AM	40:45:00	LPRSA0189608 ABC013628				
9/8/54 2:15 PM	9/9/54 9:00 AM	18:45:00	LPRSA0189607 ABC013627				
9/10/54 1:15 PM	9/12/54 9:00 AM	43:45:00	LPRSA0189606 ABC013626				
9/14/54 3:45 PM	9/18/54 9:00 AM	89:15:00	LPRSA0189605 ABC013625				
10/4/54 8:45 AM	10/8/54 3:45 PM	103:00:00	LPRSA0189604 ABC013624				
10/27/54 4:15 PM	10/28/54 9:15 AM	17:00:00	LPRSA0189602 ABC013622				
10/29/54 9:15 AM	10/30/54 8:45 AM	23:30:00	LPRSA0189601 ABC013621				
11/2/54 12:45 PM	11/4/54 9:00 AM	44:15:00	LPRSA0189600 ABC013620				
11/8/54 1:00 PM	11/9/54 1:00 PM	24:00:00	LPRSA0189599 ABC013619				
11/15/54 9:30 AM	11/29/54 9:30 AM	336:00:00	LPRSA0189597 ABC013617				
12/9/54 1:45 PM	12/9/54 5:45 PM	4:00:00	LPRSA0189596 ABC013616				
12/14/54 9:15 AM	12/14/54 3:45 PM	6:30:00	LPRSA0189595 ABC013615				
12/16/54 2:00 PM	12/16/54 8:00 PM	6:00:00	LPRSA0189594 ABC013614				
12/18/54 10:15 AM	12/19/54 8:15 AM	22:00:00	LPRSA0189593 ABC013613				
12/29/54 12:45 PM	12/30/54 3:00 PM	26:15:00	LPRSA0189585 ABC013605				
1/6/55 1:45 PM	1/7/55 9:00 AM	19:15:00	LPRSA0189582 ABC013602				
1/28/55 9:30 AM	2/4/55 10:00 AM	168:30:00	LPRSA0189580 ABC013600				
2/14/55 3:00 PM	2/18/55 4:15 PM	97:15:00	LPRSA0189580 ABC013600				
2/21/55 1:15 PM	3/7/55 9:30 AM	332:15:00	LPRSA0189579 ABC013599				
3/7/55 1:30 PM	3/7/55 4:00 PM	2:30:00	LPRSA0189578 ABC013598				
3/21/55 2:45 PM	3/23/55 1:30 PM	46:45:00	LPRSA0189577 ABC013597				
3/28/55 1:15 PM	3/30/55 4:15 PM	51:00:00	LPRSA0189576 ABC013596				
4/6/55 2:45 PM	4/7/55 4:00 PM	25:15:00	LPRSA0189575 ABC013595				
4/12/55 2:15 PM	4/14/55 1:15 PM	47:00:00	LPRSA0189574 ABC013594				
5/31/55 1:00 PM	5/31/55 6:00 PM	5:00:00	LPRSA0189572 ABC013592				

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**Exhibit 2-4b. Documented PVSC Bypasses at Verona Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
6/21/55 11:00 PM	6/22/55 8:15 AM	9:15:00	LPRSA0189571 ABC013591				
8/7/55 11:15 PM	8/8/55 2:30 AM	3:15:00	LPRSA0189570 ABC013590				
8/11/55 7:15 PM	8/14/55 8:30 AM	61:15:00	LPRSA0189569 ABC013589				
8/15/55 4:45 PM	8/16/55 2:30 PM	21:45:00	LPRSA0189568 ABC013588				
8/18/55 4:00 PM	8/19/55 2:45 AM	10:45:00	LPRSA0189567 ABC013587				
8/21/55 9:45 PM	8/22/55 9:15 AM	11:30:00	LPRSA0189566 ABC013586				
8/24/55 3:00 PM	8/25/55 9:00 AM	18:00:00	LPRSA0189565 ABC013585				
8/25/55 4:00 PM	8/26/55 9:30 AM	17:30:00	LPRSA0189564 ABC013584				
9/24/55 5:15 AM	9/26/55 8:15 AM	51:00:00	LPRSA0189563 ABC013583				
10/6/55 8:15 AM	10/7/55 11:00 AM	26:45:00	LPRSA0189562 ABC013582				
10/14/55 11:15 AM	10/15/55 2:45 PM	27:30:00	LPRSA0189561 ABC013581				
10/16/55 2:50 PM	10/16/55 8:30 PM	5:40:00	LPRSA0189561 ABC013581				
10/17/55 3:45 PM	10/21/55 1:30 PM	93:45:00	LPRSA0189561 ABC013581				
10/30/55 9:45 AM	10/30/55 4:25 PM	6:40:00	LPRSA0189560 ABC013580				
11/10/55 3:45 PM	11/11/55 1:15 AM	9:30:00	LPRSA0189559 ABC013579				
11/11/55 11:00 AM	11/12/55 8:30 AM	21:30:00	LPRSA0189559 ABC013579				
11/16/55 9:15 AM	11/16/55 2:15 PM	5:00:00	LPRSA0189558 ABC013578				
1/30/56 1:00 PM	1/31/56 8:15 AM	19:15:00	LPRSA0189556 ABC013576				
2/2/56 11:45 AM	2/3/56 8:15 AM	20:30:00	LPRSA0189555 ABC013575				
2/6/56 3:45 PM	2/7/56 12:30 PM	20:45:00	LPRSA0189554 ABC013574				
2/18/56 8:30 AM	2/19/56 8:00 AM	23:30:00	LPRSA0189553 ABC013573				
3/8/56 1:45 AM	3/9/56 8:30 AM	30:45:00	LPRSA0189552 ABC013572				
3/14/56 9:15 AM	3/15/56 9:00 AM	23:45:00	LPRSA0189551 ABC013571				
3/21/56 3:20 PM	3/23/56 2:00 PM	46:40:00	LPRSA0189549 ABC013569				
3/29/56 4:30 PM	3/30/56 9:00 AM	16:30:00	LPRSA0189547 ABC013567				
4/7/56 2:25 AM	4/9/56 1:15 PM	58:50:00	LPRSA0189546 ABC013566				
4/11/56 6:00 PM	4/12/56 8:20 AM	14:20:00	LPRSA0189545 ABC013565				
5/2/56 9:20 PM	5/3/56 9:00 AM	11:40:00	LPRSA0189544 ABC013564				
6/2/56 3:10 PM	6/3/56 12:00 PM	20:50:00	LPRSA0189543 ABC013563				
6/27/56 5:00 PM	6/27/56 6:10 PM	1:10:00	LPRSA0189542 ABC013562				
7/16/56 2:30 PM	7/17/56 9:00 AM	18:30:00	LPRSA0189541 ABC013561				
7/21/56 9:45 AM	7/21/56 9:50 PM	12:05:00	LPRSA0189540 ABC013560				
7/27/56 9:45 AM	7/27/56 3:15 PM	5:30:00	LPRSA0189539 ABC013559				
8/6/56 4:30 PM	8/7/56 8:15 AM	15:45:00	LPRSA0189538 ABC013558				
8/21/56 4:15 AM	8/21/56 4:00 PM	11:45:00	LPRSA0189537 ABC013557				
9/6/56 6:15 PM	9/7/56 8:00 AM	13:45:00	LPRSA0189536 ABC013556				
9/7/56 10:00 AM	9/7/56 4:30 PM	6:30:00	LPRSA0189535 ABC013555				
9/27/56 4:00 PM	9/28/56 8:15 AM	16:15:00	LPRSA0189534 ABC013554				
10/22/56 9:45 PM	10/23/56 8:15 AM	10:30:00	LPRSA0189533 ABC013553				
10/31/56 11:45 AM	10/31/56 7:30 PM	7:45:00	LPRSA0189532 ABC013552				
11/1/56 10:15 AM	11/1/56 4:00 PM	5:45:00	LPRSA0189532 ABC013552				
11/18/56 2:15 AM	11/18/56 11:00 AM	8:45:00	LPRSA0189531 ABC013551				
11/22/56 12:30 AM	11/22/56 8:00 AM	7:30:00	LPRSA0189530 ABC013550				
12/9/56 3:00 PM	12/10/56 8:30 AM	17:30:00	LPRSA0189529 ABC013549				
12/14/56 8:15 AM	12/14/56 4:00 PM	7:45:00	LPRSA0189528 ABC013548				
12/22/56 10:15 PM	12/23/56 10:00 AM	11:45:00	LPRSA0189527 ABC013547				
1/23/57 3:45 AM	1/23/57 12:00 PM	8:15:00	LPRSA0189498 ABC013518				
2/9/57 2:00 PM	2/10/57 8:45 AM	18:45:00	LPRSA0189497 ABC013517				
2/26/57 3:45 PM	2/26/57 10:30 PM	6:45:00	LPRSA0189496 ABC013516				
3/1/57 3:15 PM	3/2/57 10:30 AM	19:15:00	LPRSA0189524 ABC013544				
3/8/57 9:30 AM	3/10/57 9:50 AM	48:20:00	LPRSA0189523 ABC013543				
3/15/57 8:35 PM	3/16/57 9:35 AM	13:00:00	LPRSA0189522 ABC013542				
3/19/57 9:30 PM	3/20/57 3:30 PM	18:00:00	LPRSA0189521 ABC013541				

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**Exhibit 2-4b. Documented PVSC Bypasses at Verona Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source	Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
4/2/57 7:45 AM	4/2/57 1:45 PM	6:00:00	LPRSA0189520	ABC013540				
4/4/57 9:10 PM	4/5/57 10:45 AM	13:35:00	LPRSA0189519	ABC013539				
4/5/57 2:15 PM	4/6/57 1:20 PM	23:05:00	LPRSA0189518	ABC013538				
4/9/57 9:00 AM	4/9/57 3:45 PM	6:45:00	LPRSA0189516	ABC013536				
4/10/57 9:00 AM	4/10/57 3:45 PM	6:45:00	LPRSA0189515	ABC013535				
4/11/57 8:15 AM	4/11/57 3:45 PM	7:30:00	LPRSA0189514	ABC013534				
4/12/57 8:15 AM	4/12/57 4:00 PM	7:45:00	LPRSA0189513	ABC013533				
4/18/57 10:00 PM	4/19/57 1:30 PM	15:30:00	LPRSA0189512	ABC013532				
4/23/57 6:55 AM	4/23/57 2:00 PM	7:05:00	LPRSA0189511	ABC013531				
4/25/57 4:00 PM	4/26/57 9:30 AM	17:30:00	LPRSA0189510	ABC013530				
4/29/57 1:15 PM	4/29/57 3:45 PM	2:30:00	LPRSA0189509	ABC013529				
5/14/57 9:00 PM	5/15/57 10:45 AM	13:45:00	LPRSA0189508	ABC013528				
* 5/16/57 12:00 AM	8/25/57 11:59 PM							
8/26/57 1:30 AM	8/26/57 7:00 PM	17:30:00	LPRSA0189507	ABC013527				
9/10/57 10:45 PM	9/11/57 8:45 AM	10:00:00	LPRSA0189506	ABC013526				
9/17/57 12:00 AM	9/17/57 9:15 AM	9:15:00	LPRSA0189505	ABC013525				
* 9/18/57 12:00 AM	12/19/57 11:59 PM							
10/23/58 2:15 AM	10/23/58 3:20 PM	13:05:00	LPRSA0189469	ABC013489				
10/25/58 7:00 PM	10/27/58 1:30 PM	42:30:00	LPRSA0189468	ABC013488				
3/6/59 2:15 AM	3/6/59 4:15 PM	14:00:00	LPRSA0189458	ABC013478				
6/2/59 6:30 PM	6/3/59 8:00 AM	13:30:00	LPRSA0189454	ABC013474				
9/1/59 6:30 PM	9/2/59 8:00 AM	13:30:00	LPRSA0189445	ABC013465				
11/24/59 4:15 PM	11/25/59 8:25 AM	16:10:00	LPRSA0189432	ABC013452				
12/7/59 2:30 AM	12/7/59 10:00 AM	7:30:00	LPRSA0189431	ABC013451				
2/19/60 1:40 AM	2/19/60 10:15 AM	8:35:00	LPRSA0189421	ABC013441				
4/3/60 10:00 PM	4/4/60 8:30 AM	10:30:00	LPRSA0189416	ABC013436				
7/30/60 9:45 AM	7/31/60 9:00 AM	23:15:00	LPRSA0189402	ABC013422				
8/19/60 3:45 PM	8/20/60 9:05 AM	17:20:00	LPRSA0189399	ABC013419				
9/12/60 9:45 AM	9/13/60 8:30 AM	22:45:00	LPRSA0189397	ABC013417				
9/19/60 10:30 AM	9/19/60 3:45 PM	5:15:00	LPRSA0189396	ABC013416				
12/21/60 11:35 AM	12/22/60 9:30 AM	21:55:00	LPRSA0189391	ABC013411				
1/1/61 9:15 AM	1/2/61 9:00 AM	23:45:00	LPRSA0189389	ABC013409				
3/14/61 8:15 AM	3/14/61 1:00 PM	4:45:00	LPRSA0189382	ABC013402				
3/23/61 1:45 PM	3/24/61 10:30 AM	20:45:00	LPRSA0189383	ABC013403				
4/10/61 10:50 AM	4/10/61 3:15 PM	4:25:00	LPRSA0189376	ABC013396				
4/13/61 6:05 AM	4/13/61 3:15 PM	9:10:00	LPRSA0189375	ABC013395				
4/16/61 12:05 PM	4/17/61 8:15 AM	20:10:00	LPRSA0189373	ABC013393				
4/24/61 10:00 AM	4/24/61 2:30 PM	4:30:00	LPRSA0189370	ABC013390				
9/20/61 3:30 PM	9/21/61 3:00 PM	23:30:00	LPRSA0189348	ABC013368				
12/18/61 11:15 AM	12/20/61 8:30 AM	45:15:00	LPRSA0189338	ABC013358				
2/26/62 3:30 PM	2/27/62 8:15 AM	16:45:00	LPRSA0189329	ABC013349				
2/27/62 1:30 PM	2/28/62 3:15 PM	25:45:00	LPRSA0189329	ABC013349				
3/12/62 10:05 AM	3/13/62 8:20 AM	22:15:00	LPRSA0189327	ABC013347				
3/21/62 3:05 PM	3/22/62 8:30 AM	17:25:00	LPRSA0189326	ABC013346				
4/7/62 2:50 PM	4/9/62 8:30 AM	41:40:00	LPRSA0189324	ABC013344				
4/9/62 3:40 PM	4/10/62 8:20 AM	16:40:00	LPRSA0189323	ABC013343				
9/27/62 2:15 PM	9/28/62 1:30 PM	23:15:00	LPRSA0189296	ABC013316				
10/5/62 9:20 AM	10/7/62 9:35 AM	48:15:00	LPRSA0189295	ABC013315				
10/23/62 11:20 AM	10/23/62 3:45 PM	4:25:00	LPRSA0189291	ABC013311				
10/25/62 10:45 PM	10/26/62 3:00 PM	16:15:00	LPRSA0189290	ABC013310				

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**Exhibit 2-4b. Documented PVSC Bypasses at Verona Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
10/30/62 3:00 PM	10/31/62 10:30 AM	19:30:00	LPRSA0189289 ABC013309				
11/3/62 10:00 AM	11/5/62 8:10 AM	46:10:00	LPRSA0189288 ABC013308				
11/18/62 12:45 PM	11/19/62 8:15 AM	19:30:00	LPRSA0189285 ABC013305				
11/21/62 10:10 PM	11/23/62 9:15 AM	35:05:00	LPRSA0189284 ABC013304				
12/5/62 8:30 AM	12/6/62 3:00 PM	30:30:00	LPRSA0189283 ABC013303				
* 1/1/63 12:00 AM 12/31/74 11:59 PM							
Subtotal		8516:55:00					

* Missing data.

Source: PVSC throw-out logs.

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**Exhibit 2-4b. Documented PVSC Bypasses at Verona Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1975)

	1/1/75	1/1/75	0:00:00 LPRSA0196644	*	*		
	6/29/75	6/29/75	0:00:00 LPRSA0196645	*	*		
*	6/30/75	12/31/04					
*	Average Overflow			7.01	0.75	243.0	1,525
	Estimated Mass/Bypass Time (lb/hr)						593
	Estimated Bypassed Volume Rate (MG/hr)			0.292			

* Note: On these dates, bypasses not measured; overflow data are used to calculate average mass and volume.
Regulator is noted as inoperable; both tide gates are leaking.

(2005-2014)

		Elapsed Time (hr)	Frequency of Overflows (#/yr)	
	1/1/2005	12/31/2005	266.69	12
	1/1/2006	12/31/2006	595.73	43
	1/1/2007	12/31/2007	433.43	34
	1/1/2008	12/31/2008	608.10	46
	1/1/2009	12/31/2009	410.00	35
	1/1/2010	12/31/2010	461.08	36
	1/1/2011	12/31/2011	362.16	24
	1/1/2012	12/31/2012	43.34	6
	1/1/2013	12/31/2013	351.91	38
	1/1/2014	12/31/2014	351.91	38
*	1/1/2015	9/30/2016		
Subtotal (2005-2014)			3884.35	
Average annual bypass time (hr)			388.44	

* Missing data.

Source: PVSC, NJPDES permit reports to NJDEP, CSO Regulator Events, 2008-2015.

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**Exhibit 2-4c. Documented PVSC Bypasses at Herbert Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
(1950-1962)							
*	8/2/24 12:00 PM	10/3/50 11:59 PM	LPRSA0198629				
	10/4/50 10:00 PM	10/5/50 11:30 AM	13:30:00 LPRSA0188654	ABC012674			
	10/10/50 2:30 AM	10/10/50 8:30 AM	6:00:00 LPRSA0188652	ABC012672			
	10/12/50 1:30 PM	10/13/50 9:30 AM	20:00:00 LPRSA0188650	ABC012670			
	10/23/50 1:30 PM	10/24/50 9:00 AM	19:30:00 LPRSA0188648	ABC012668			
	11/20/50 6:00 PM	11/21/50 9:00 AM	15:00:00 LPRSA0188646	ABC012666			
	11/25/50 9:00 AM	11/25/50 1:00 PM	4:00:00 LPRSA0188643	ABC012663			
	12/4/50 12:30 PM	12/4/50 9:00 PM	8:30:00 LPRSA0188641	ABC012661			
	12/7/50 4:00 PM	12/8/50 11:30 AM	19:30:00 LPRSA0189637	ABC012657			
	12/15/50 10:30 PM	12/16/50 9:00 AM	10:30:00 LPRSA0188639	ABC012659			
	12/29/50 12:30 PM	12/30/50 11:30 AM	23:00:00 LPRSA0188635	ABC012655			
	1/7/51 5:00 PM	1/8/51 9:00 AM	16:00:00 LPRSA0188633	ABC012653			
	1/11/51 5:30 PM	1/12/51 8:30 AM	15:00:00 LPRSA0188619	ABC012639			
	1/14/51 6:00 PM	1/15/51 12:00 PM	18:00:00 LPRSA0188631	ABC012651			
	1/23/51 2:00 AM	1/24/51 2:00 PM	36:00:00 LPRSA0188621	ABC012641			
	1/25/51 4:00 PM	1/25/51 7:00 PM	3:00:00 LPRSA0188623	ABC012643			
	1/28/51 5:00 PM	1/29/51 8:30 AM	15:30:00 LPRSA0188625	ABC012645			
	1/29/51 7:30 PM	1/30/51 10:00 AM	14:30:00 LPRSA0188625	ABC012645			
	1/31/51 4:00 PM	2/2/51 10:00 AM	42:00:00 LPRSA0188628	ABC012648			
	2/10/51 5:30 AM	2/10/51 12:00 PM	6:30:00 LPRSA0188588	ABC012608			
	2/13/51 7:45 PM	2/14/51 10:00 AM	14:15:00 LPRSA0188588	ABC012608			
	2/14/51 5:45 PM	2/15/51 9:30 AM	15:45:00 LPRSA0188588	ABC012608			
	2/17/51 4:00 AM	2/18/51 11:30 AM	31:30:00 LPRSA0188588	ABC012608			
	2/19/51 5:00 PM	2/20/51 2:30 PM	21:30:00 LPRSA0188596	ABC012616			
	2/22/51 10:30 AM	2/22/51 11:45 AM	1:15:00 LPRSA0188596	ABC012616			
	2/23/51 8:30 AM	2/23/51 10:00 AM	1:30:00 LPRSA0188596	ABC012616			
	3/1/51 3:00 PM	3/2/51 10:00 AM	19:00:00 LPRSA0188604	ABC012624			
	3/3/51 3:00 PM	3/5/51 10:30 AM	43:30:00 LPRSA0188606	ABC012626			
	3/13/51 4:30 PM	3/15/51 9:30 AM	41:00:00 LPRSA0188609	ABC012629			
	3/16/51 4:00 PM	3/19/51 9:30 AM	65:30:00 LPRSA0188612	ABC012632			
	3/19/51 5:00 PM	3/20/51 12:00 PM	19:00:00 LPRSA0188616	ABC012636			
	3/22/51 12:00 AM	12/31/51 11:59 PM					
	2/17/52 3:30 AM	2/18/52 9:00 AM	29:30:00 LPRSA0189755	ABC013775			
	2/20/52 6:00 PM	2/21/52 1:00 PM	19:00:00 LPRSA0189754	ABC013774			
	2/29/52 9:00 PM	3/3/52 11:00 AM	62:00:00 LPRSA0189753	ABC013773			
	3/3/52 5:30 PM	3/5/52 2:30 PM	45:00:00 LPRSA0189753	ABC013773			
	3/11/52 5:00 AM	3/17/52 2:00 PM	153:00:00 LPRSA0189752	ABC013772			
	3/19/52 10:30 AM	3/21/52 11:00 AM	48:30:00 LPRSA0189751	ABC013771			
	3/22/52 5:00 PM	3/25/52 10:30 AM	65:30:00 LPRSA0189750	ABC013770			
	4/4/52 4:45 PM	4/6/52 9:00 AM	40:15:00 LPRSA0189749	ABC013769			
	4/14/52 4:00 AM	4/16/52 11:00 AM	55:00:00 LPRSA0189748	ABC013768			
	4/23/52 4:30 PM	4/24/52 10:00 AM	17:30:00 LPRSA0189747	ABC013767			
	4/25/52 11:00 AM	4/28/52 4:15 PM	77:15:00 LPRSA0189744	ABC013764			
	4/29/52 3:30 PM	5/5/52 5:00 PM	145:30:00 LPRSA0189745	ABC013765			
	5/6/52 3:30 PM	5/9/52 2:45 PM	71:15:00 LPRSA0189745	ABC013765			
	5/11/52 10:00 PM	5/13/52 10:30 AM	36:30:00 LPRSA0189743	ABC013763			
	5/18/52 7:30 AM	5/23/52 2:00 PM	126:30:00 LPRSA0189741	ABC013761			
	5/13/52 3:00 PM	5/14/52 9:00 AM	18:00:00 LPRSA0189743	ABC013763			
	5/25/52 9:00 AM	5/27/52 8:45 AM	47:45:00 LPRSA0189740	ABC013760			
	5/29/52 6:30 PM	6/3/52 10:00 AM	111:30:00 LPRSA0189738	ABC013758			
	6/3/52 12:45 PM	6/6/52 9:30 AM	68:45:00 LPRSA0189736	ABC013756			

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**Exhibit 2-4c. Documented PVSC Bypasses at Herbert Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
6/9/52 8:45 AM	6/14/52 9:00 AM	120:15:00	LPRSA0189736	ABC013756				
6/17/52 5:00 PM	6/18/52 10:30 AM	17:30:00	LPRSA0189735	ABC013755				
6/19/52 3:45 PM	6/20/52 10:15 AM	18:30:00	LPRSA0189734	ABC013754				
6/27/52 3:50 PM	6/28/52 8:20 AM	16:30:00	LPRSA0189729	ABC013749				
6/29/52 12:30 AM	6/30/52 9:30 AM	33:00:00	LPRSA0189728	ABC013748				
7/21/52 4:00 PM	7/22/52 10:00 AM	18:00:00	LPRSA0189725	ABC013745				
7/31/52 4:30 PM	8/1/52 9:30 AM	17:00:00	LPRSA0189724	ABC013744				
8/2/52 3:50 PM	8/3/52 9:00 AM	17:10:00	LPRSA0189725	ABC013745				
8/6/52 2:30 PM	8/6/52 8:00 PM	5:30:00	LPRSA0189715	ABC013735				
8/8/52 1:30 PM	8/11/52 8:45 AM	67:15:00	LPRSA0189715	ABC013735				
8/11/52 5:00 PM	8/12/52 8:30 AM	15:30:00	LPRSA0189719	ABC013739				
8/12/52 4:45 PM	8/13/52 8:30 AM	15:45:00	LPRSA0189721	ABC013741				
8/13/52 4:30 PM	8/14/52 8:30 AM	16:00:00	LPRSA0189720	ABC013742				
8/15/52 4:30 PM	8/17/52 8:30 AM	40:00:00	LPRSA0189714	ABC013734				
8/21/52 4:00 PM	8/22/52 9:30 AM	17:30:00	LPRSA0189713	ABC013733				
8/30/52 9:30 AM	9/2/52 8:30 AM	71:00:00	LPRSA0189712	ABC013732				
9/2/52 4:30 PM	9/3/52 1:30 PM	21:00:00	LPRSA0189711	ABC013731				
9/15/52 3:45 PM	9/17/52 4:30 PM	48:45:00	LPRSA0189709	ABC013729				
9/18/52 12:30 PM	9/20/52 8:30 AM	44:00:00	LPRSA0189710	ABC013730				
9/23/52 10:00 AM	9/23/52 1:30 PM	3:30:00	LPRSA0189708	ABC013728				
10/2/52 6:30 PM	10/3/52 1:00 PM	18:30:00	LPRSA0189707	ABC013727				
10/28/52 5:00 PM	10/29/52 8:30 AM	15:30:00	LPRSA0189706	ABC013726				
11/2/52 8:45 AM	11/2/52 1:45 PM	5:00:00	LPRSA0189705	ABC013725				
11/3/52 1:30 PM	11/4/52 8:30 AM	19:00:00	LPRSA0189703	ABC013723				
11/10/52 4:00 PM	11/11/52 8:30 AM	16:30:00	LPRSA0189704	ABC013724				
11/14/52 1:00 PM	12/1/52 1:00 PM	408:00:00	LPRSA0189701	ABC013721				
12/2/52 1:30 PM	12/5/52 5:30 PM	76:00:00	LPRSA0189702	ABC013722				
12/9/52 11:00 AM	1/18/53 4:45 PM	965:45:00	LPRSA0189655	ABC013675				
1/21/53 2:30 PM	1/22/53 8:30 AM	18:00:00	LPRSA0189656	ABC013676				
1/24/53 9:30 AM	1/24/53 3:30 PM	6:00:00	LPRSA0189657	ABC013677				
2/11/53 5:00 PM	2/13/53 10:00 AM	41:00:00	LPRSA0189658	ABC013678				
2/15/53 10:30 AM	2/15/53 4:00 PM	5:30:00	LPRSA0189659	ABC013679				
2/21/53 8:30 AM	2/22/53 8:45 PM	36:15:00	LPRSA0189660	ABC013680				
2/25/53 8:30 AM	3/10/53 6:30 PM	322:00:00	LPRSA0189661	ABC013681				
3/15/53 1:30 PM	3/16/53 10:00 AM	20:30:00	LPRSA0189665	ABC013685				
3/24/53 9:30 AM	3/26/53 9:30 AM	48:00:00	LPRSA0189665	ABC013685				
3/30/53 2:30 PM	4/29/53 9:15 AM	714:45:00	LPRSA0189665	ABC013685				
4/30/53 4:30 PM	5/1/53 1:15 PM	20:45:00	LPRSA0189665	ABC013685				
5/8/53 10:30 AM	5/9/53 9:45 AM	23:15:00	LPRSA0189665	ABC013685				
5/13/53 10:00 AM	5/22/53 6:30 PM	224:30:00	LPRSA0189665	ABC013685				
6/13/53 4:45 PM	6/14/53 1:45 PM	21:00:00	LPRSA0189674	ABC013694				
6/18/53 4:15 PM	6/19/53 9:15 AM	17:00:00	LPRSA0189676	ABC013696				
6/22/53 9:45 AM	6/22/53 6:30 PM	8:45:00	LPRSA0189677	ABC013697				
6/23/53 9:45 AM	7/2/53 1:45 PM	220:00:00	LPRSA0189678	ABC013698				
10/29/53 2:00 PM	10/29/53 4:15 PM	2:15:00	LPRSA0189693	ABC013713				
10/29/53 6:45 PM	10/30/53 8:30 AM	13:45:00	LPRSA0189694	ABC013714				
11/7/53 7:00 AM	11/8/53 10:30 AM	27:30:00	LPRSA0189695	ABC013715				
11/16/53 9:30 AM			LPRSA0189653	ABC013673				
11/23/53 9:45 AM	11/24/53 1:30 PM	27:45:00	LPRSA0189698	ABC013718				
11/25/53 9:45 AM	11/26/53 8:45 AM	23:00:00	LPRSA0189652	ABC013672				
11/30/53 9:45 AM	12/4/53 10:45 AM	97:00:00	LPRSA0189651	ABC013671				
12/6/53 9:15 AM	12/7/53 9:30 AM	24:15:00	LPRSA0189650	ABC013670				
12/9/53 4:15 PM	12/10/53 4:15 PM	24:00:00	LPRSA0189649	ABC013669				
12/12/53 4:45 PM	12/13/53 8:15 AM	15:30:00	LPRSA0189648	ABC013668				

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**Exhibit 2-4c. Documented PVSC Bypasses at Herbert Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
12/14/53 6:00 AM	12/15/53 10:30 AM	28:30:00	LPRSA0189647	ABC013667				
12/28/53 4:45 PM	12/29/53 1:15 PM	20:30:00	LPRSA0189646	ABC013666				
1/14/54 4:30 PM	1/18/54 9:30 AM	89:00:00	LPRSA0189592	ABC013612				
1/18/54 2:30 PM	1/22/54 9:30 AM	91:00:00	LPRSA0189591	ABC013611				
1/22/54 3:00 PM	1/25/54 10:00 AM	67:00:00	LPRSA0189590	ABC013610				
1/25/54 2:00 PM	2/2/54 9:45 AM	187:45:00	LPRSA0189590	ABC013610				
2/3/54 1:15 PM	2/4/54 9:15 AM	20:00:00	LPRSA0189589	ABC013609				
2/24/54 1:30 PM	2/27/54 8:30 AM	67:00:00	LPRSA0189621	ABC013641				
3/1/54 10:45 AM	3/5/54 1:30 PM	98:45:00	LPRSA0189619	ABC013639				
4/28/54 5:15 PM	4/29/54 9:15 AM	16:00:00	LPRSA0189612	ABC013632				
5/7/54 9:00 AM	5/26/54 10:45 AM	457:45:00	LPRSA0189631	ABC013651				
6/1/54 11:30 AM	6/9/54 9:45 AM	190:15:00	LPRSA0189630	ABC013650				
7/7/54 4:30 PM	7/8/54 9:30 AM	17:00:00	LPRSA0189624	ABC013644				
8/3/54 9:15 AM	8/4/54 9:15 AM	24:00:00	LPRSA0189620	ABC013640				
8/9/54 9:00 AM	8/11/54 9:30 AM	48:30:00	LPRSA0189622	ABC013642				
8/19/54 10:45 PM	8/20/54 10:00 AM	11:15:00	LPRSA0189611	ABC013631				
8/20/54 4:30 PM	8/22/54 8:30 AM	40:00:00	LPRSA0189610	ABC013630				
8/25/54 4:45 PM	8/26/54 9:15 AM	16:30:00	LPRSA0189609	ABC013629				
8/30/54 4:45 PM	9/1/54 9:30 AM	40:45:00	LPRSA0189608	ABC013628				
9/8/54 2:30 PM	9/9/54 9:15 AM	18:45:00	LPRSA0189607	ABC013627				
9/10/54 1:30 PM	9/12/54 9:15 AM	43:45:00	LPRSA0189606	ABC013626				
9/14/54 4:30 PM	9/18/54 1:00 PM	92:30:00	LPRSA0189605	ABC013625				
10/4/54 9:00 AM	10/8/54 3:30 PM	102:30:00	LPRSA0189604	ABC013624				
10/27/54 4:30 PM	10/28/54 9:30 AM	17:00:00	LPRSA0189602	ABC013622				
10/29/54 9:30 AM	10/30/54 9:00 AM	23:30:00	LPRSA0189601	ABC013621				
11/2/54 1:00 PM	11/4/54 9:15 AM	44:15:00	LPRSA0189600	ABC013620				
11/8/54 1:15 PM	11/9/54 1:15 PM	24:00:00	LPRSA0189599	ABC013619				
11/15/54 9:45 AM	12/2/54 2:30 AM	400:45:00	LPRSA0189597	ABC013617				
12/9/54 2:00 PM	12/10/54 1:15 PM	23:15:00	LPRSA0189596	ABC013616				
12/14/54 9:30 AM	12/15/54 1:00 PM	27:30:00	LPRSA0189595	ABC013615				
12/16/54 3:00 PM	12/16/54 8:15 PM	5:15:00	LPRSA0189594	ABC013614				
12/18/54 10:30 AM	12/19/54 8:30 AM	22:00:00	LPRSA0189593	ABC013613				
12/29/54 1:00 PM	12/30/54 2:45 PM	25:45:00	LPRSA0189585	ABC013605				
1/6/55 2:00 PM	1/7/55 9:15 AM	19:15:00	LPRSA0189582	ABC013602				
1/28/55 9:45 AM	2/4/55 10:15 AM	168:30:00	LPRSA0189580	ABC013600				
2/14/55 3:15 PM	2/18/55 4:30 PM	97:15:00	LPRSA0189580	ABC013600				
2/21/55 1:30 PM	3/7/55 9:45 AM	332:15:00	LPRSA0189579	ABC013599				
3/7/55 1:45 PM	3/7/55 4:15 PM	2:30:00	LPRSA0189578	ABC013598				
3/21/55 3:00 PM	3/23/55 1:45 PM	46:45:00	LPRSA0189577	ABC013597				
3/28/55 1:30 PM	3/30/55 4:30 PM	51:00:00	LPRSA0189576	ABC013596				
4/6/55 2:30 PM	4/7/55 4:15 PM	25:45:00	LPRSA0189575	ABC013595				
4/12/55 2:30 PM	4/14/55 1:30 PM	47:00:00	LPRSA0189574	ABC013594				
5/31/55 1:15 PM	5/31/55 6:15 PM	5:00:00	LPRSA0189572	ABC013592				
6/21/55 11:15 PM	6/22/55 8:30 AM	9:15:00	LPRSA0189571	ABC013591				
8/7/55 11:30 PM	8/8/55 8:15 AM	8:45:00	LPRSA0189570	ABC013590				
8/11/55 7:30 PM	8/14/55 8:45 AM	61:15:00	LPRSA0189569	ABC013589				
8/15/55 5:00 PM	8/16/55 2:45 PM	21:45:00	LPRSA0189568	ABC013588				
8/18/55 4:15 PM	8/20/55 9:15 AM	41:00:00	LPRSA0189567	ABC013587				
8/21/55 10:00 PM	8/24/55 12:45 PM	62:45:00	LPRSA0189566	ABC013586				
8/24/55 3:15 PM	8/25/55 9:15 AM	18:00:00	LPRSA0189565	ABC013585				
8/25/55 4:15 PM	8/26/55 9:45 AM	17:30:00	LPRSA0189564	ABC013584				
9/24/55 5:30 AM	9/26/55 8:30 AM	51:00:00	LPRSA0189563	ABC013583				
10/6/55 8:30 AM	10/7/55 1:15 PM	28:45:00	LPRSA0189562	ABC013582				

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**Exhibit 2-4c. Documented PVSC Bypasses at Herbert Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
10/14/55 1:00 PM	10/15/55 3:00 PM	26:00:00	LPRSA0189561	ABC013581				
10/16/55 3:00 PM	10/25/55 10:00 AM	211:00:00	LPRSA0189561	ABC013581				
10/30/55 10:00 AM	11/1/55 1:30 PM	51:30:00	LPRSA0189560	ABC013580				
11/10/55 4:00 PM	11/12/55 8:45 AM	40:45:00	LPRSA0189559	ABC013579				
11/16/55 9:30 AM	11/18/55 9:45 AM	48:15:00	LPRSA0189558	ABC013578				
1/30/56 1:15 PM	1/31/56 8:30 AM	19:15:00	LPRSA0189556	ABC013576				
2/2/56 12:00 PM	2/3/56 8:30 AM	20:30:00	LPRSA0189555	ABC013575				
2/6/56 4:00 PM	2/7/56 12:45 PM	20:45:00	LPRSA0189554	ABC013574				
2/18/56 8:45 AM	2/19/56 8:15 AM	23:30:00	LPRSA0189553	ABC013573				
3/8/56 2:00 AM	3/9/56 8:45 AM	30:45:00	LPRSA0189552	ABC013572				
3/14/56 10:45 AM	3/15/56 10:30 AM	23:45:00	LPRSA0189551	ABC013571				
3/21/56 4:05 PM	3/23/56 2:45 PM	46:40:00	LPRSA0189549	ABC013569				
3/29/56 5:30 PM	3/30/56 10:00 AM	16:30:00	LPRSA0189547	ABC013567				
4/7/56 3:30 AM	4/9/56 1:30 PM	58:00:00	LPRSA0189546	ABC013566				
4/11/56 5:25 PM	4/12/56 10:35 AM	17:10:00	LPRSA0189545	ABC013565				
5/2/56 11:05 PM	5/3/56 11:00 AM	11:55:00	LPRSA0189544	ABC013564				
6/2/56 5:00 PM	6/4/56 11:45 AM	42:45:00	LPRSA0189543	ABC013563				
6/27/56 4:50 PM	6/27/56 8:15 PM	3:25:00	LPRSA0189542	ABC013562				
7/16/56 4:15 PM	7/17/56 10:45 AM	18:30:00	LPRSA0189541	ABC013561				
7/21/56 11:30 AM	7/21/56 11:35 PM	12:05:00	LPRSA0189540	ABC013560				
7/27/56 10:00 AM	7/27/56 4:15 PM	6:15:00	LPRSA0189539	ABC013559				
8/6/56 6:15 PM	8/7/56 10:00 AM	15:45:00	LPRSA0189538	ABC013558				
8/21/56 6:00 AM	8/22/56 9:40 AM	27:40:00	LPRSA0189537	ABC013557				
9/6/56 6:30 PM	9/7/56 8:15 AM	13:45:00	LPRSA0189536	ABC013556				
9/7/56 10:15 AM	9/8/56 1:00 PM	26:45:00	LPRSA0189535	ABC013555				
9/27/56 6:15 PM	9/28/56 10:00 AM	15:45:00	LPRSA0189534	ABC013554				
10/22/56 10:00 PM	10/23/56 8:30 AM	10:30:00	LPRSA0189533	ABC013553				
10/31/56 1:30 PM	10/31/56 8:15 PM	6:45:00	LPRSA0189532	ABC013552				
11/1/56 11:00 AM	11/4/56 11:30 AM	72:30:00	LPRSA0189532	ABC013552				
11/18/56 4:00 AM	11/18/56 12:45 PM	8:45:00	LPRSA0189531	ABC013551				
11/22/56 2:15 AM	11/22/56 9:45 AM	7:30:00	LPRSA0189530	ABC013550				
12/9/56 4:45 PM	12/10/56 10:15 AM	17:30:00	LPRSA0189529	ABC013549				
12/14/56 10:00 AM	12/17/56 9:30 AM	71:30:00	LPRSA0189528	ABC013548				
12/22/56 11:45 PM	12/23/56 11:45 AM	12:00:00	LPRSA0189527	ABC013547				
12/27/56 3:00 PM	12/28/56 10:30 AM	19:30:00	LPRSA0189526	ABC013546				
1/8/57 11:00 AM	1/15/57 11:00 AM	168:00:00	LPRSA0189499	ABC013519				
1/23/57 5:30 AM	1/23/57 3:45 PM	10:15:00	LPRSA0189498	ABC013518				
2/9/57 3:45 PM	2/10/57 10:30 AM	18:45:00	LPRSA0189497	ABC013517				
2/26/57 5:30 PM	2/27/57 2:30 PM	21:00:00	LPRSA0189496	ABC013516				
3/1/57 4:00 PM	3/2/57 12:15 PM	20:15:00	LPRSA0189524	ABC013544				
3/8/57 11:00 AM	3/10/57 10:50 AM	47:50:00	LPRSA0189523	ABC013543				
3/19/57 11:00 PM	3/21/57 10:15 AM	35:15:00	LPRSA0189521	ABC013541				
4/2/57 9:15 AM	4/2/57 4:00 PM	6:45:00	LPRSA0189520	ABC013540				
4/4/57 9:25 PM	4/5/57 11:00 AM	13:35:00	LPRSA0189519	ABC013539				
4/5/57 2:30 PM	4/6/57 2:00 PM	23:30:00	LPRSA0189518	ABC013538				
4/9/57 9:15 AM	4/9/57 4:00 PM	6:45:00	LPRSA0189516	ABC013536				
4/10/57 9:15 AM	4/10/57 4:00 PM	6:45:00	LPRSA0189515	ABC013535				
4/11/57 8:30 AM	4/11/57 4:00 PM	7:30:00	LPRSA0189514	ABC013534				
4/12/57 8:30 AM	4/12/57 4:15 PM	7:45:00	LPRSA0189513	ABC013533				
4/18/57 10:45 PM	4/19/57 2:00 PM	15:15:00	LPRSA0189512	ABC013532				
4/23/57 7:15 AM	4/23/57 2:15 PM	7:00:00	LPRSA0189511	ABC013531				
4/29/57 1:30 PM	4/29/57 4:00 PM	2:30:00	LPRSA0189509	ABC013529				
5/14/57 9:15 PM	5/15/57 11:00 AM	13:45:00	LPRSA0189508	ABC013528				

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**Exhibit 2-4c. Documented PVSC Bypasses at Herbert Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
*	5/16/57 12:00 AM	8/25/57 11:59 PM						
	8/26/57 2:15 AM	8/26/57 6:30 PM	16:15:00	LPRSA0189507	ABC013527			
	9/10/57 11:15 PM	9/11/57 9:15 AM	10:00:00	LPRSA0189506	ABC013526			
	9/17/57 12:45 AM	9/17/57 11:00 AM	10:15:00	LPRSA0189505	ABC013525			
*	9/18/57 12:00 AM	12/19/57 11:59 PM						
	12/26/57 12:45 PM	12/26/57 3:00 PM	2:15:00	LPRSA0189500	ABC013520			
	1/22/58 3:00 AM	1/22/58 8:15 AM	5:15:00	LPRSA0189492	ABC013512			
	2/28/58 3:30 AM	2/28/58 1:30 PM	10:00:00	LPRSA0189488	ABC013508			
	4/28/58 10:00 AM	4/28/58 2:00 PM	4:00:00	LPRSA0189480	ABC013500			
	4/29/58 9:15 PM	4/30/58 8:30 AM	11:15:00	LPRSA0189479	ABC013499			
	5/7/58 1:15 PM	5/8/58 9:00 AM	19:45:00	LPRSA0189478	ABC013498			
	10/22/58 7:45 PM	10/24/58 9:00 AM	37:15:00	LPRSA0189469	ABC013489			
	10/25/58 6:45 PM	10/27/58 1:45 PM	43:00:00	LPRSA0189468	ABC013488			
	11/28/58 10:30 PM	11/29/58 12:30 PM	14:00:00	LPRSA0189466	ABC013486			
	3/6/59 9:30 AM	3/7/59 10:45 AM	25:15:00	LPRSA0189458	ABC013478			
	5/13/59 7:15 PM	5/14/59 8:30 AM	13:15:00	LPRSA0189438	ABC013458			
	6/2/59 6:15 PM	6/3/59 10:00 AM	15:45:00	LPRSA0189454	ABC013474			
	8/5/59 11:00 AM	8/6/59 8:30 AM	21:30:00	LPRSA0189448	ABC013468			
	8/9/59 5:00 AM	8/9/59 6:30 AM	1:30:00	LPRSA0189447	ABC013467			
	8/31/59 2:00 PM	9/2/59 1:15 PM	47:15:00	LPRSA0189445	ABC013465			
	10/1/59 1:45 PM	10/2/59 8:45 AM	19:00:00	LPRSA0189443	ABC013463			
	10/7/59 5:15 PM	10/8/59 8:15 AM	15:00:00	LPRSA0189442	ABC013462			
	10/9/59 4:30 AM	10/9/59 9:15 AM	4:45:00	LPRSA0189441	ABC013461			
	10/9/59 11:45 AM	10/10/59 2:15 PM	26:30:00	LPRSA0189440	ABC013460			
	10/24/59 10:30 AM	10/25/59 10:45 AM	24:15:00	LPRSA0189435	ABC013455			
	11/24/59 5:00 PM	11/25/59 10:55 AM	17:55:00	LPRSA0189432	ABC013452			
	12/7/59 12:40 AM	12/7/59 8:30 AM	7:50:00	LPRSA0189431	ABC013451			
	12/12/59 7:45 PM	12/13/59 10:30 AM	14:45:00	LPRSA0189430	ABC013450			
	12/29/59 12:45 AM	12/29/59 9:15 AM	8:30:00	LPRSA0189429	ABC013449			
	2/6/60 6:45 AM	2/6/60 2:00 PM	7:15:00	LPRSA0189423	ABC013443			
	2/11/60 6:15 AM	2/11/60 1:00 PM	6:45:00	LPRSA0189422	ABC013442			
	2/18/60 11:30 PM	2/19/60 3:45 PM	16:15:00	LPRSA0189421	ABC013441			
	2/25/60 11:50 PM	2/26/60 1:50 PM	14:00:00	LPRSA0189420	ABC013440			
	3/17/60 4:00 PM	3/18/60 8:40 AM	16:40:00	LPRSA0189418	ABC013438			
	4/3/60 10:45 PM	4/4/60 11:55 AM	13:10:00	LPRSA0189416	ABC013436			
	7/14/60 1:30 PM	7/15/60 10:35 AM	21:05:00	LPRSA0189404	ABC013424			
	7/30/60 10:00 AM	7/31/60 9:10 AM	23:10:00	LPRSA0189402	ABC013422			
	8/19/60 8:20 AM	8/20/60 9:15 AM	24:55:00	LPRSA0189399	ABC013419			
	9/12/60 12:45 AM	9/13/60 8:50 AM	32:05:00	LPRSA0189397	ABC013417			
	9/19/60 11:50 AM	9/21/60 10:20 PM	58:30:00	LPRSA0189396	ABC013416			
	10/20/60 9:00 AM	10/20/60 3:50 PM	6:50:00	LPRSA0189395	ABC013415			
	11/10/60 9:05 AM	11/10/60 4:00 PM	6:55:00	LPRSA0189394	ABC013414			
	12/12/60 2:30 PM	12/14/60 1:45 PM	47:15:00	LPRSA0189392	ABC013412			
	12/21/60 8:30 AM	12/22/60 11:35 AM	27:05:00	LPRSA0189391	ABC013411			
	1/1/61 9:40 AM	1/2/61 9:30 AM	23:50:00	LPRSA0189389	ABC013409			
	3/9/61 1:10 PM	3/10/61 8:20 AM	19:10:00	LPRSA0189381	ABC013401			
	3/14/61 5:15 AM	3/15/61 1:00 PM	31:45:00	LPRSA0189382	ABC013402			
	3/23/61 1:25 PM	3/24/61 2:10 PM	24:45:00	LPRSA0189383	ABC013403			
	4/10/61 9:50 AM	4/11/61 2:00 PM	28:10:00	LPRSA0189376	ABC013396			
	4/13/61 6:55 AM	4/14/61 2:55 PM	32:00:00	LPRSA0189375	ABC013395			
	4/16/61 12:55 PM	4/17/61 1:40 PM	24:45:00	LPRSA0189373	ABC013393			

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**Exhibit 2-4c. Documented PVSC Bypasses at Herbert Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
4/18/61 3:15 PM	4/20/61 1:30 PM	46:15:00	LPRSA0189371 ABC013391				
4/24/61 9:45 AM	4/27/61 8:15 AM	70:30:00	LPRSA0189370 ABC013390				
7/15/61 8:40 PM	7/17/61 10:30 AM	37:50:00	LPRSA0189358 ABC013378				
7/20/61 9:15 AM	7/21/61 8:15 AM	23:00:00	LPRSA0189357 ABC013377				
8/3/61 12:40 PM	8/4/61 11:05 AM	22:25:00	LPRSA0189354 ABC013374				
8/21/61 3:10 PM	8/22/61 8:20 AM	17:10:00	LPRSA0189353 ABC013373				
8/23/61 11:10 AM	8/24/61 2:00 PM	26:50:00	LPRSA0189352 ABC013372				
9/19/61 4:15 PM	9/22/61 11:20 AM	67:05:00	LPRSA0189348 ABC013368				
11/24/61 10:30 AM	11/25/61 10:40 AM	24:10:00	LPRSA0189341 ABC013361				
12/18/61 9:00 AM	12/20/61 1:35 PM	52:35:00	LPRSA0189338 ABC013358				
12/28/61 10:35 AM	12/29/61 9:15 AM	22:40:00	LPRSA0189337 ABC013357				
1/6/62 12:30 PM	1/8/62 1:50 PM	49:20:00	LPRSA0189336 ABC013356				
1/15/62 4:50 PM	1/16/62 8:15 AM	15:25:00	LPRSA0189335 ABC013355				
1/26/62 3:45 PM	1/27/62 10:25 AM	18:40:00	LPRSA0189334 ABC013354				
2/24/62 6:35 AM	2/25/62 12:10 PM	29:35:00	LPRSA0189330 ABC013350				
2/26/62 11:25 AM	3/1/62 3:20 PM	75:55:00	LPRSA0189329 ABC013349				
3/6/62 11:00 AM	3/7/62 9:20 AM	22:20:00	LPRSA0189328 ABC013348				
3/12/62 8:15 AM	3/13/62 1:35 PM	29:20:00	LPRSA0189327 ABC013347				
3/21/62 1:50 PM	3/22/62 8:50 AM	19:00:00	LPRSA0189326 ABC013346				
4/1/62 6:15 AM	4/2/62 10:30 AM	28:15:00	LPRSA0189325 ABC013345				
4/7/62 3:35 PM	4/9/62 9:15 AM	41:40:00	LPRSA0189324 ABC013344				
4/9/62 4:15 PM	4/10/62 9:00 AM	16:45:00	LPRSA0189323 ABC013343				
6/5/62 10:45 PM	6/6/62 8:30 AM	9:45:00	LPRSA0189315 ABC013335				
6/13/62 1:45 PM	6/14/62 8:20 AM	18:35:00	LPRSA0189314 ABC013334				
6/26/62 6:00 PM	6/27/62 8:30 AM	14:30:00	LPRSA0189312 ABC013332				
7/18/62 2:10 PM	7/19/62 8:10 AM	18:00:00	LPRSA0189310 ABC013330				
8/7/62 2:00 PM	8/8/62 8:30 AM	18:30:00	LPRSA0189308 ABC013328				
8/9/62 8:45 PM	8/10/62 3:35 PM	18:50:00	LPRSA0189307 ABC013327				
8/10/62 11:15 PM	8/11/62 1:50 PM	14:35:00	LPRSA0189306 ABC013326				
8/17/62 6:45 PM	8/18/62 10:05 AM	15:20:00	LPRSA0189305 ABC013325				
8/21/62 11:55 AM	8/22/62 1:45 PM	25:50:00	LPRSA0189304 ABC013324				
8/28/62 6:00 AM	8/29/62 1:15 PM	31:15:00	LPRSA0189303 ABC013323				
9/5/62 11:00 AM	9/6/62 8:10 AM	21:10:00	LPRSA0189301 ABC013321				
9/17/62 6:40 PM	9/18/62 8:25 AM	13:45:00	LPRSA0189299 ABC013319				
9/27/62 10:00 AM	9/29/62 11:20 AM	49:20:00	LPRSA0189296 ABC013316				
10/5/62 5:15 AM	10/7/62 10:25 AM	53:10:00	LPRSA0189295 ABC013315				
10/23/62 11:55 AM	10/24/62 10:55 AM	23:00:00	LPRSA0189291 ABC013311				
10/25/62 11:25 PM	10/27/62 10:05 AM	34:40:00	LPRSA0189290 ABC013310				
10/30/62 2:45 PM	11/1/62 3:00 PM	48:15:00	LPRSA0189289 ABC013309				
11/3/62 10:10 AM	11/5/62 8:25 AM	46:15:00	LPRSA0189288 ABC013308				
11/9/62 4:15 PM	11/11/62 11:50 AM	43:35:00	LPRSA0189287 ABC013307				
11/13/62 3:50 PM	11/14/62 8:25 AM	16:35:00	LPRSA0189286 ABC013306				
11/18/62 1:00 PM	11/19/62 3:35 PM	26:35:00	LPRSA0189285 ABC013305				
11/21/62 10:20 PM	11/23/62 9:25 AM	35:05:00	LPRSA0189284 ABC013304				
12/5/62 8:40 AM	12/8/62 11:00 AM	74:20:00	LPRSA0189283 ABC013303				
12/22/62 1:00 PM	12/24/62 10:20 AM	45:20:00	LPRSA0189282 ABC013302				
12/29/62 8:55 PM	12/30/62 12:45 PM	15:50:00	LPRSA0189280 ABC013300				
* 1/1/63 12:00 AM	9/30/74 11:59 PM						

Subtotal 13434:55:00

* Missing data.

Source: PVSC throw-out logs.

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NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

**Exhibit 2-4c. Documented PVSC Bypasses at Herbert Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1974-19745)

10/16/74 4:00 AM	10/17/74 8:00 PM	40:00:00	LPRSA0195712				
12/2/74 1:00 AM	12/3/74 8:00 AM	31:00:00	LPRSA0195714				
12/8/74 3:00 PM	12/9/74 9:00 AM	18:00:00	LPRSA0195714				
12/16/74 11:00 AM	12/17/74 9:00 AM	22:00:00	LPRSA0195714				
1/1/75	1/1/75	0:00:00	LPRSA0196708				
1/9/75	1/9/75	1:00:00	LPRSA0196708	3.6	0.15	195	244
1/9/75 6:00 AM	1/9/75 1:00 PM	6:00:00	LPRSA0195715				
1/13/75	1/13/75	5:00:00	LPRSA0196708	10.6	2.21	195	3,599
1/13/75 10:00 AM	1/14/75 8:00 AM	17:00:00	LPRSA0195715				
1/18/75	1/18/75	2:48:00	LPRSA0196708	12.5	1.46	195	2,377
1/18/75 3:00 PM	1/19/75 6:00 AM	12:12:00	LPRSA0195715				
1/29/75	1/29/75	2:48:00	LPRSA0196708	2.0	0.23	195	380
1/29/75 6:00 AM	1/29/75 3:00 PM	6:12:00	LPRSA0195715				
2/24/75	2/24/75	0:30:00	LPRSA0196708	2.4	0.05	195	81
2/24/75 5:00 AM	2/25/75 6:00 AM	24:30:00	LPRSA0195716				
3/19/75 4:00 PM	3/20/75 1:00 PM	21:00:00	LPRSA0195717				
4/3/75 8:00 AM	4/3/75 5:00 PM	9:00:00	LPRSA0195718				
4/24/75 3:00 AM	4/24/75 8:00 AM	5:00:00	LPRSA0195718				
4/25/75 2:00 AM	4/25/75 8:00 AM	6:00:00	LPRSA0195718				
5/13/75 10:00 PM	5/14/75 8:00 AM	10:00:00	LPRSA0195719				
6/1/75 7:00 AM	6/1/75 4:00 PM	9:00:00	LPRSA0195720				
6/5/75	6/6/75	6:42:00	LPRSA0196709	11.4	3.18	195	5,187
6/5/75 10:00 PM	6/6/75 11:00 AM	6:18:00	LPRSA0195720				
6/6/75 5:00 PM	6/7/75 8:00 AM	15:00:00	LPRSA0195720				
6/12/75 11:00 AM	6/13/75 9:00 PM	34:00:00	LPRSA0195720				
7/4/75 6:00 AM	7/4/75 1:00 PM	7:00:00	LPRSA0195721				
7/7/75 10:00 AM	7/7/75 11:00 PM	13:00:00	LPRSA0195721				
7/9/75 8:00 PM	7/10/75 2:00 AM	6:00:00	LPRSA0195721				
7/13/75 12:00 PM	7/16/75 5:00 PM	77:00:00	LPRSA0195721				
7/25/75 3:00 AM	7/25/75 3:00 PM	12:00:00	LPRSA0195721				
9/23/75 3:00 AM	9/28/75 11:00 AM	128:00:00	LPRSA0195722				
* 10/1/75	12/31/04						
Subtotal		554:00:00			7.28		11,870
Estimated Mass/Bypass Time (lb/hr)							631
Estimated Bypassed Volume Rate (MG/hr)				0.387			

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

(2005-2014)

		Elapsed Time (hours)	Frequency of Overflows (#/yr)
1/1/2005	12/31/2005	453.21	36
1/1/2006	12/31/2006	612.47	46
1/1/2007	12/31/2007	409.25	30
1/1/2008	12/31/2008	607.96	43
1/1/2009	12/31/2009	171.35	10
1/1/2010	12/31/2010	463.29	38
1/1/2011	12/31/2011	348.62	24

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**Exhibit 2-4c. Documented PVSC Bypasses at Herbert Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
1/1/2012	12/31/2012	115.63	24				
1/1/2013	12/31/2013	316.84	34				
1/1/2014	12/31/2014	316.84	34				
* 1/1/2015	9/30/2016						
Subtotal (2005-2014)		3815.46					
Average annual bypass time (hr)		381.55					

* Missing data.

Source: PVSC, NJPDES permit reports to NJDEP, CSO Regulator Events, 2008-2015.

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**Exhibit 2-4d. Documented PVSC Bypasses at 4th Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1950-1962)

*	8/2/24 12:00 PM	10/3/50 11:59 PM	LPRSA0198629				
	10/4/50 10:00 PM	10/5/50 11:30 AM	13:30:00 LPRSA0188654	ABC012674			
	10/10/50 2:30 AM	10/10/50 8:30 AM	6:00:00 LPRSA0188652	ABC012672			
	10/12/50 1:30 PM	10/13/50 9:30 AM	20:00:00 LPRSA0188650	ABC012670			
	10/23/50 1:30 PM	10/24/50 9:00 AM	19:30:00 LPRSA0188648	ABC012668			
	11/20/50 6:00 PM	11/21/50 9:00 AM	15:00:00 LPRSA0188646	ABC012666			
	11/25/50 9:00 AM	11/25/50 1:00 PM	4:00:00 LPRSA0188643	ABC012663			
	12/4/50 12:30 PM	12/4/50 9:00 PM	8:30:00 LPRSA0188641	ABC012661			
	12/7/50 4:00 PM	12/8/50 11:30 AM	19:30:00 LPRSA0188637	ABC012657			
	12/15/50 10:30 PM	12/16/50 9:00 AM	10:30:00 LPRSA0188639	ABC012659			
	12/29/50 12:30 PM	12/30/50 11:30 AM	23:00:00 LPRSA0188635	ABC012655			
	1/7/51 5:00 PM	1/8/51 9:00 AM	16:00:00 LPRSA0188633	ABC012653			
	1/11/51 5:30 PM	1/12/51 8:30 AM	15:00:00 LPRSA0188619	ABC012639			
	1/14/51 6:00 PM	1/15/51 12:00 PM	18:00:00 LPRSA0188631	ABC012651			
	1/23/51 2:00 AM	1/24/51 2:00 PM	36:00:00 LPRSA0188621	ABC012641			
	1/25/51 4:00 PM	1/25/51 7:00 PM	3:00:00 LPRSA0188623	ABC012643			
	1/28/51 5:00 PM	1/29/51 8:30 AM	15:30:00 LPRSA0188625	ABC012645			
	1/29/51 7:30 PM	1/30/51 10:00 AM	14:30:00 LPRSA0188625	ABC012645			
	1/31/51 4:00 PM	2/2/51 10:00 AM	42:00:00 LPRSA0188628	ABC012648			
	2/7/51 11:00 AM	2/8/51 2:30 PM	27:30:00 LPRSA0188585	ABC012605			
	2/10/51 5:30 AM	2/10/51 12:00 PM	6:30:00 LPRSA0188588	ABC012608			
	2/13/51 7:45 PM	2/14/51 10:00 AM	14:15:00 LPRSA0188588	ABC012608			
	2/14/51 5:45 PM	2/15/51 9:30 AM	15:45:00 LPRSA0188588	ABC012608			
	2/17/51 4:00 AM	2/18/51 11:30 AM	31:30:00 LPRSA0188588	ABC012608			
	2/19/51 5:00 PM	2/20/51 2:30 PM	21:30:00 LPRSA0188596	ABC012616			
	2/22/51 10:30 AM	2/22/51 11:45 AM	1:15:00 LPRSA0188596	ABC012616			
	2/23/51 8:30 AM	2/23/51 10:00 AM	1:30:00 LPRSA0188596	ABC012616			
	3/1/51 3:00 PM	3/2/51 10:00 AM	19:00:00 LPRSA0188604	ABC012624			
	3/3/51 3:00 PM	3/5/51 10:30 AM	43:30:00 LPRSA0188606	ABC012626			
	3/13/51 4:30 PM	3/15/51 9:30 AM	41:00:00 LPRSA0188609	ABC012629			
	3/16/51 4:00 PM	3/19/51 9:30 AM	65:30:00 LPRSA0188612	ABC012632			
	3/19/51 5:00 PM	3/20/51 12:00 PM	19:00:00 LPRSA0188616	ABC012636			
	3/22/51 12:00 AM	12/31/51 11:59 PM					
	2/17/52 3:30 AM	2/18/52 9:00 AM	29:30:00 LPRSA0189755	ABC013775			
	2/20/52 6:00 PM	2/21/52 1:30 PM	19:30:00 LPRSA0189754	ABC013774			
	2/29/52 9:00 PM	3/3/52 11:00 AM	62:00:00 LPRSA0189753	ABC013773			
	3/3/52 5:30 PM	3/5/52 2:30 PM	45:00:00 LPRSA0189753	ABC013773			
	3/11/52 5:00 AM	3/17/52 2:00 PM	153:00:00 LPRSA0189752	ABC013772			
	3/19/52 10:30 AM	3/21/52 11:00 AM	48:30:00 LPRSA0189751	ABC013771			
	3/22/52 5:00 PM	3/25/52 10:30 AM	65:30:00 LPRSA0189750	ABC013770			
	4/4/52 4:45 PM	4/6/52 9:00 AM	40:15:00 LPRSA0189749	ABC013769			
	4/14/52 4:00 AM	4/16/52 11:00 AM	55:00:00 LPRSA0189748	ABC013768			
	4/23/52 4:30 PM	4/24/52 10:30 AM	18:00:00 LPRSA0189747	ABC013767			
	4/25/52 11:00 AM	4/28/52 5:00 PM	78:00:00 LPRSA0189744	ABC013764			
	4/29/52 3:15 PM	5/7/52 2:30 PM	191:15:00 LPRSA0189744	ABC013764			
	5/11/52 10:00 PM	5/13/52 11:00 AM	37:00:00 LPRSA0189743	ABC013763			
	5/18/52 7:45 AM	5/23/52 2:15 PM	126:30:00 LPRSA0189741	ABC013761			
	5/25/52 9:15 AM	5/27/52 9:00 AM	47:45:00 LPRSA0189740	ABC013760			
	5/29/52 6:15 PM	5/30/52 9:30 AM	15:15:00 LPRSA0189738	ABC013758			
	6/3/52 12:15 PM	6/6/52 9:45 AM	69:30:00 LPRSA0189736	ABC013756			
	6/9/52 9:00 AM	6/14/52 9:30 AM	120:30:00 LPRSA0189737	ABC013757			

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NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

**Exhibit 2-4d. Documented PVSC Bypasses at 4th Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source	Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
6/17/52 5:15 PM	6/18/52 11:00 AM	17:45:00	LPRSA0189735	ABC013755				
6/19/52 3:30 PM	6/20/52 10:00 AM	18:30:00	LPRSA0189734	ABC013754				
6/27/52 4:00 PM	6/28/52 8:30 AM	16:30:00	LPRSA0189729	ABC013749				
6/29/52 12:45 AM	6/30/52 9:45 AM	33:00:00	LPRSA0189728	ABC013748				
7/8/52 4:00 PM	7/10/52 9:40 AM	41:40:00	LPRSA0189730	ABC013750				
7/21/52 4:15 PM	7/22/52 10:15 AM	18:00:00	LPRSA0189725	ABC013745				
7/31/52 4:45 PM	8/1/52 9:45 AM	17:00:00	LPRSA0189724	ABC013744				
8/2/52 4:00 PM	8/3/52 9:15 AM	17:15:00	LPRSA0189725	ABC013745				
8/6/52 3:00 PM	8/7/52 2:00 PM	23:00:00	LPRSA0189715	ABC013735				
8/8/52 2:00 PM	8/11/52 9:00 AM	67:00:00	LPRSA0189715	ABC013735				
8/11/52 5:15 PM	8/12/52 8:45 AM	15:30:00	LPRSA0189719	ABC013739				
8/12/52 5:00 PM	8/13/52 8:45 AM	15:45:00	LPRSA0189721	ABC013741				
8/13/52 4:45 PM	8/14/52 8:45 AM	16:00:00	LPRSA0189720	ABC013742				
8/15/52 4:45 PM	8/17/52 8:45 AM	40:00:00	LPRSA0189714	ABC013734				
8/21/52 4:15 PM	8/22/52 9:45 AM	17:30:00	LPRSA0189713	ABC013733				
8/30/52 9:45 AM	9/2/52 8:45 AM	71:00:00	LPRSA0189712	ABC013732				
9/2/52 4:45 PM	9/3/52 1:45 PM	21:00:00	LPRSA0189711	ABC013731				
9/15/52 4:00 PM	9/17/52 4:45 PM	48:45:00	LPRSA0189709	ABC013729				
9/18/52 12:45 PM	9/20/52 8:45 AM	44:00:00	LPRSA0189710	ABC013730				
9/23/52 10:15 AM	9/23/52 1:45 PM	3:30:00	LPRSA0189708	ABC013728				
10/2/52 6:45 PM	10/3/52 1:15 PM	18:30:00	LPRSA0189707	ABC013727				
10/28/52 5:15 PM	10/29/52 8:45 AM	15:30:00	LPRSA0189706	ABC013726				
11/2/52 9:00 AM	11/2/52 2:00 PM	5:00:00	LPRSA0189705	ABC013725				
11/3/52 1:45 PM	11/4/52 8:45 AM	19:00:00	LPRSA0189703	ABC013723				
11/10/52 4:15 PM	11/11/52 8:45 AM	16:30:00	LPRSA0189704	ABC013724				
11/14/52 1:15 PM	12/1/52 1:15 PM	408:00:00	LPRSA0189701	ABC013721				
12/2/52 1:45 PM	12/5/52 5:45 PM	76:00:00	LPRSA0189702	ABC013722				
1/21/53 2:45 PM	1/22/53 8:45 AM	18:00:00	LPRSA0189656	ABC013676				
1/24/53 9:45 AM	1/24/53 3:45 PM	6:00:00	LPRSA0189657	ABC013677				
2/11/53 5:15 PM	2/13/53 10:15 AM	41:00:00	LPRSA0189658	ABC013678				
2/15/53 10:45 AM	2/15/53 4:15 PM	5:30:00	LPRSA0189659	ABC013679				
2/21/53 8:45 AM	2/22/53 9:00 PM	36:15:00	LPRSA0189660	ABC013680				
2/25/53 8:45 AM	3/10/53 6:15 PM	321:30:00	LPRSA0189661	ABC013681				
3/15/53 1:00 PM	3/23/53 2:00 PM	193:00:00	LPRSA0189666	ABC013686				
3/24/53 9:45 AM	3/25/53 10:00 AM	24:15:00	LPRSA0189666	ABC013686				
3/25/53 3:45 PM	3/26/53 9:45 AM	18:00:00	LPRSA0189666	ABC013686				
3/30/53 2:45 PM	4/29/53 9:30 AM	714:45:00	LPRSA0189666	ABC013686				
4/30/53 4:30 PM	5/1/53 2:00 PM	21:30:00	LPRSA0189666	ABC013686				
5/1/53 4:45 PM	5/5/53 4:00 PM	95:15:00	LPRSA0189666	ABC013686				
5/8/53 10:15 PM	5/9/53 9:30 AM	11:15:00	LPRSA0189666	ABC013686				
5/13/53 11:00 PM	5/22/53 6:45 PM	211:45:00	LPRSA0189666	ABC013686				
5/25/53 10:00 AM	5/25/53 3:15 PM	5:15:00	LPRSA0189666	ABC013686				
5/27/53 10:45 AM	5/28/53 1:45 PM	27:00:00	LPRSA0189666	ABC013686				
6/13/53 5:00 PM	6/14/53 2:00 PM	21:00:00	LPRSA0189674	ABC013694				
6/18/53 4:30 PM	6/19/53 9:30 AM	17:00:00	LPRSA0189676	ABC013696				
6/22/53 10:00 AM	6/22/53 6:45 PM	8:45:00	LPRSA0189677	ABC013697				
6/23/53 10:00 AM	7/2/53 2:00 PM	220:00:00	LPRSA0189678	ABC013698				
7/6/53 8:00 PM	7/7/53 8:30 AM	12:30:00	LPRSA0189681	ABC013701				
7/20/53 9:25 PM	7/21/53 8:55 AM	11:30:00	LPRSA0189682	ABC013702				
7/23/53 8:45 AM	7/23/53 3:15 PM	6:30:00	LPRSA0189684	ABC013704				
8/10/53 1:00 AM	8/10/53 10:30 AM	9:30:00	LPRSA0189685	ABC013705				
8/14/53 1:15 PM	8/15/53 8:30 AM	19:15:00	LPRSA0189686	ABC013706				
9/16/53 1:45 AM	9/16/53 8:15 AM	6:30:00	LPRSA0189688	ABC013708				
10/6/53 6:15 PM	10/7/53 9:30 AM	15:15:00	LPRSA0189689	ABC013709				

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**Exhibit 2-4d. Documented PVSC Bypasses at 4th Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
10/27/53 4:50 PM	10/28/53 2:00 PM	21:10:00	LPRSA0189692	ABC013712				
10/29/53 2:15 PM	10/29/53 4:30 PM	2:15:00	LPRSA0189693	ABC013713				
10/29/53 7:00 PM	10/30/53 9:30 AM	14:30:00	LPRSA0189694	ABC013714				
11/7/53 7:15 AM	11/8/53 10:45 AM	27:30:00	LPRSA0189695	ABC013715				
* 11/16/53 9:45 AM			LPRSA0189653	ABC013673				
11/23/53 10:00 AM	11/24/53 1:45 PM	27:45:00	LPRSA0189698	ABC013718				
11/25/53 10:00 AM	11/26/53 9:00 AM	23:00:00	LPRSA0189652	ABC013672				
11/30/53 10:00 AM	12/4/53 11:00 AM	97:00:00	LPRSA0189651	ABC013671				
12/6/53 9:30 AM	12/7/53 9:45 AM	24:15:00	LPRSA0189650	ABC013670				
12/9/53 4:30 PM	12/10/53 4:30 PM	24:00:00	LPRSA0189649	ABC013669				
12/12/53 4:30 PM	12/13/53 8:30 AM	16:00:00	LPRSA0189648	ABC013668				
12/14/53 6:15 AM	12/14/53 3:30 PM	9:15:00	LPRSA0189647	ABC013667				
12/28/53 5:00 PM	12/29/53 1:30 PM	20:30:00	LPRSA0189646	ABC013666				
1/14/54 4:45 PM	1/18/54 9:45 AM	89:00:00	LPRSA0189592	ABC013612				
1/18/54 2:45 PM	1/22/54 9:45 AM	91:00:00	LPRSA0189591	ABC013611				
1/22/54 2:45 PM	1/25/54 10:00 AM	67:15:00	LPRSA0189590	ABC013610				
1/25/54 1:45 PM	2/2/54 10:00 AM	188:15:00	LPRSA0189590	ABC013610				
2/3/54 1:30 PM	2/4/54 9:30 AM	20:00:00	LPRSA0189589	ABC013609				
2/8/54 5:30 PM	2/9/54 9:30 AM	16:00:00	LPRSA0189588	ABC013608				
2/16/54 5:00 PM	2/17/54 2:00 PM	21:00:00	LPRSA0189587	ABC013607				
2/21/54 5:15 PM	2/22/54 8:45 AM	15:30:00	LPRSA0189586	ABC013606				
2/23/54 12:00 PM	2/27/54 8:45 AM	92:45:00	LPRSA0189621	ABC013641				
3/1/54 11:00 AM	3/5/54 1:45 PM	98:45:00	LPRSA0189619	ABC013639				
3/13/54 3:00 PM	3/15/54 9:30 AM	42:30:00	LPRSA0189618	ABC013638				
3/19/54 4:30 PM	3/20/54 9:05 AM	16:35:00	LPRSA0189617	ABC013637				
3/25/54 10:00 AM	3/26/54 8:15 AM	22:15:00	LPRSA0189616	ABC013636				
4/8/54 1:45 PM	4/9/54 9:30 AM	19:45:00	LPRSA0189613	ABC013633				
4/13/54 12:30 PM	4/13/54 3:40 PM	3:10:00	LPRSA0189623	ABC013643				
4/16/54 1:10 PM	4/18/54 10:10 AM	45:00:00	LPRSA0189632	ABC013652				
4/19/54 3:45 PM	4/21/54 4:20 PM	48:35:00	LPRSA0189615	ABC013635				
4/23/54 1:30 PM	4/25/54 9:30 AM	44:00:00	LPRSA0189614	ABC013634				
4/28/54 3:15 PM	4/29/54 9:30 AM	18:15:00	LPRSA0189612	ABC013632				
5/3/54 10:45 AM	5/26/54 10:45 AM	552:00:00	LPRSA0189631	ABC013651				
6/1/54 11:45 AM	6/9/54 10:00 AM	190:15:00	LPRSA0189630	ABC013650				
7/7/54 4:45 PM	7/8/54 9:45 AM	17:00:00	LPRSA0189624	ABC013644				
8/3/54 9:30 AM	8/4/54 9:30 AM	24:00:00	LPRSA0189620	ABC013640				
8/9/54 9:15 AM	8/11/54 9:45 AM	48:30:00	LPRSA0189622	ABC013642				
8/19/54 11:00 PM	8/20/54 10:15 AM	11:15:00	LPRSA0189611	ABC013631				
8/20/54 4:45 PM	8/22/54 8:45 AM	40:00:00	LPRSA0189610	ABC013630				
8/25/54 5:00 PM	8/26/54 9:30 AM	16:30:00	LPRSA0189609	ABC013629				
8/30/54 5:00 PM	9/1/54 9:45 AM	40:45:00	LPRSA0189608	ABC013628				
9/8/54 2:45 PM	9/9/54 9:30 AM	18:45:00	LPRSA0189607	ABC013627				
9/10/54 1:45 PM	9/12/54 9:30 AM	43:45:00	LPRSA0189606	ABC013626				
9/14/54 4:45 PM	9/18/54 1:15 PM	92:30:00	LPRSA0189605	ABC013625				
10/4/54 9:15 AM	10/8/54 3:15 PM	102:00:00	LPRSA0189604	ABC013624				
10/15/54 11:30 AM	10/16/54 7:00 AM	19:30:00	LPRSA0189603	ABC013623				
10/27/54 4:45 PM	10/28/54 9:45 AM	17:00:00	LPRSA0189602	ABC013622				
10/29/54 9:45 AM	10/30/54 9:15 AM	23:30:00	LPRSA0189601	ABC013621				
11/2/54 1:15 PM	11/4/54 9:30 AM	44:15:00	LPRSA0189600	ABC013620				
11/8/54 1:30 PM	11/9/54 1:30 PM	24:00:00	LPRSA0189599	ABC013619				
11/15/54 10:00 AM	12/2/54 2:45 AM	400:45:00	LPRSA0189597	ABC013617				
12/9/54 2:15 PM	12/10/54 1:30 PM	23:15:00	LPRSA0189596	ABC013616				
12/14/54 9:45 AM	12/15/54 1:15 PM	27:30:00	LPRSA0189595	ABC013615				
12/16/54 3:15 PM	12/16/54 8:30 PM	5:15:00	LPRSA0189594	ABC013614				

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**Exhibit 2-4d. Documented PVSC Bypasses at 4th Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
12/18/54 10:45 AM	12/19/54 8:45 AM	22:00:00	LPRSA0189593	ABC013613				
12/29/54 1:15 PM	12/30/54 2:30 PM	25:15:00	LPRSA0189585	ABC013605				
1/6/55 2:15 PM	1/7/55 9:30 AM	19:15:00	LPRSA0189582	ABC013602				
1/28/55 10:00 AM	2/4/55 10:30 AM	168:30:00	LPRSA0189580	ABC013600				
2/14/55 3:30 PM	2/18/55 4:45 PM	97:15:00	LPRSA0189580	ABC013600				
2/21/55 1:45 PM	3/7/55 10:00 AM	332:15:00	LPRSA0189579	ABC013599				
3/7/55 2:00 PM	3/7/55 4:30 PM	2:30:00	LPRSA0189578	ABC013598				
3/21/55 3:15 PM	3/23/55 2:00 PM	46:45:00	LPRSA0189577	ABC013597				
3/28/55 1:45 PM	3/30/55 4:45 PM	51:00:00	LPRSA0189576	ABC013596				
4/6/55 2:15 PM	4/7/55 4:30 PM	26:15:00	LPRSA0189575	ABC013595				
4/12/55 2:45 PM	4/14/55 1:45 PM	47:00:00	LPRSA0189574	ABC013594				
5/31/55 1:30 PM	5/31/55 6:30 PM	5:00:00	LPRSA0189572	ABC013592				
6/21/55 11:30 PM	6/22/55 8:45 AM	9:15:00	LPRSA0189571	ABC013591				
8/7/55 11:45 PM	8/8/55 8:30 AM	8:45:00	LPRSA0189570	ABC013590				
8/11/55 7:45 PM	8/14/55 9:00 AM	61:15:00	LPRSA0189569	ABC013589				
8/15/55 5:15 PM	8/16/55 3:00 PM	21:45:00	LPRSA0189568	ABC013588				
8/18/55 4:30 PM	8/20/55 9:30 AM	41:00:00	LPRSA0189567	ABC013587				
8/21/55 10:15 PM	8/24/55 1:00 PM	62:45:00	LPRSA0189566	ABC013586				
8/24/55 3:30 PM	8/25/55 9:30 AM	18:00:00	LPRSA0189565	ABC013585				
8/25/55 4:30 PM	8/26/55 10:00 AM	17:30:00	LPRSA0189564	ABC013584				
9/24/55 5:45 AM	9/26/55 8:45 AM	51:00:00	LPRSA0189563	ABC013583				
10/6/55 8:45 AM	10/7/55 1:30 PM	28:45:00	LPRSA0189562	ABC013582				
10/14/55 1:15 PM	10/15/55 3:15 PM	26:00:00	LPRSA0189561	ABC013581				
10/16/55 3:15 PM	10/25/55 10:15 AM	211:00:00	LPRSA0189561	ABC013581				
10/30/55 10:15 AM	11/1/55 1:45 PM	51:30:00	LPRSA0189560	ABC013580				
11/10/55 4:15 PM	11/12/55 9:00 AM	40:45:00	LPRSA0189559	ABC013579				
11/16/55 9:45 AM	11/18/55 10:00 AM	48:15:00	LPRSA0189558	ABC013578				
1/30/56 1:30 PM	1/31/56 8:45 AM	19:15:00	LPRSA0189556	ABC013576				
2/2/56 12:15 PM	2/3/56 8:45 AM	20:30:00	LPRSA0189555	ABC013575				
2/6/56 4:15 PM	2/7/56 1:00 PM	20:45:00	LPRSA0189554	ABC013574				
2/18/56 9:00 AM	2/19/56 8:30 AM	23:30:00	LPRSA0189553	ABC013573				
3/8/56 2:15 AM	3/9/56 9:00 AM	30:45:00	LPRSA0189552	ABC013572				
3/21/56 3:50 PM	3/23/56 2:30 PM	46:40:00	LPRSA0189549	ABC013569				
3/29/56 5:15 PM	3/30/56 9:45 AM	16:30:00	LPRSA0189547	ABC013567				
4/7/56 3:10 AM	4/9/56 1:45 PM	58:35:00	LPRSA0189546	ABC013566				
4/11/56 5:10 PM	4/12/56 10:20 AM	17:10:00	LPRSA0189545	ABC013565				
5/2/56 10:55 PM	5/3/56 10:45 AM	11:50:00	LPRSA0189544	ABC013564				
6/2/56 4:45 PM	6/4/56 11:30 AM	42:45:00	LPRSA0189543	ABC013563				
6/27/56 4:35 PM	6/27/56 6:15 PM	1:40:00	LPRSA0189542	ABC013562				
7/16/56 4:00 PM	7/17/56 10:30 AM	18:30:00	LPRSA0189541	ABC013561				
7/21/56 11:15 AM	7/21/56 11:20 PM	12:05:00	LPRSA0189540	ABC013560				
7/27/56 10:15 AM	7/28/56 9:35 AM	23:20:00	LPRSA0189539	ABC013559				
8/6/56 6:00 PM	8/7/56 9:45 AM	15:45:00	LPRSA0189538	ABC013558				
8/21/56 4:30 AM	8/22/56 9:25 AM	28:55:00	LPRSA0189537	ABC013557				
9/6/56 6:45 PM	9/7/56 8:30 AM	13:45:00	LPRSA0189536	ABC013556				
9/7/56 10:30 AM	9/8/56 12:45 PM	26:15:00	LPRSA0189535	ABC013555				
9/27/56 5:30 PM	9/28/56 9:45 AM	16:15:00	LPRSA0189534	ABC013554				
10/22/56 10:15 PM	10/23/56 8:45 AM	10:30:00	LPRSA0189533	ABC013553				
10/31/56 1:15 PM	10/31/56 8:00 PM	6:45:00	LPRSA0189532	ABC013552				
11/1/56 10:45 AM	11/4/56 11:45 AM	73:00:00	LPRSA0189532	ABC013552				
11/18/56 3:45 AM	11/18/56 12:30 PM	8:45:00	LPRSA0189531	ABC013551				
11/22/56 2:00 AM	11/22/56 9:30 AM	7:30:00	LPRSA0189530	ABC013550				
12/9/56 4:30 PM	12/10/56 10:00 AM	17:30:00	LPRSA0189529	ABC013549				

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**Exhibit 2-4d. Documented PVSC Bypasses at 4th Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
12/14/56 9:45 AM	12/17/56 9:15 AM	71:30:00	LPRSA0189528	ABC013548				
12/22/56 11:30 PM	12/23/56 11:30 AM	12:00:00	LPRSA0189527	ABC013547				
1/23/57 5:15 AM	1/23/57 3:30 PM	10:15:00	LPRSA0189498	ABC013518				
2/9/57 3:30 PM	2/10/57 10:15 AM	18:45:00	LPRSA0189497	ABC013517				
2/26/57 5:15 PM	2/27/57 2:15 PM	21:00:00	LPRSA0189496	ABC013516				
3/1/57 3:45 PM	3/2/57 12:00 PM	20:15:00	LPRSA0189524	ABC013544				
3/8/57 10:45 AM	3/10/57 10:40 AM	47:55:00	LPRSA0189523	ABC013543				
3/19/57 10:45 PM	3/21/57 10:00 AM	35:15:00	LPRSA0189521	ABC013541				
4/2/57 9:00 AM	4/2/57 3:45 PM	6:45:00	LPRSA0189520	ABC013540				
4/4/57 9:40 PM	4/5/57 11:15 AM	13:35:00	LPRSA0189519	ABC013539				
4/5/57 2:45 PM	4/6/57 1:50 PM	23:05:00	LPRSA0189518	ABC013538				
4/9/57 10:45 AM	4/9/57 5:30 PM	6:45:00	LPRSA0189516	ABC013536				
4/10/57 10:45 AM	4/10/57 5:30 PM	6:45:00	LPRSA0189515	ABC013535				
4/11/57 10:00 AM	4/11/57 5:30 PM	7:30:00	LPRSA0189514	ABC013534				
4/12/57 10:00 AM	4/12/57 5:45 PM	7:45:00	LPRSA0189513	ABC013533				
4/18/57 10:30 PM	4/19/57 2:15 PM	15:45:00	LPRSA0189512	ABC013532				
4/23/57 8:30 AM	4/23/57 3:30 PM	7:00:00	LPRSA0189511	ABC013531				
4/29/57 1:45 PM	4/29/57 4:15 PM	2:30:00	LPRSA0189509	ABC013529				
5/14/57 10:30 PM	5/15/57 12:15 PM	13:45:00	LPRSA0189508	ABC013528				
* 5/16/57 12:00 AM	8/25/57 11:59 PM							
8/26/57 2:00 AM	8/26/57 6:45 PM	16:45:00	LPRSA0189507	ABC013527				
9/10/57 11:30 PM	9/11/57 9:30 AM	10:00:00	LPRSA0189506	ABC013526				
9/17/57 12:30 AM	9/17/57 10:45 AM	10:15:00	LPRSA0189505	ABC013525				
* 9/18/57 12:00 AM	12/19/57 11:59 PM							
12/26/57 12:30 PM	12/26/57 2:45 PM	2:15:00	LPRSA0189500	ABC013520				
1/22/58 3:20 AM	1/22/58 8:30 AM	5:10:00	LPRSA0189492	ABC013512				
2/28/58 3:45 AM	2/28/58 1:45 PM	10:00:00	LPRSA0189488	ABC013508				
4/28/58 10:15 AM	4/28/58 2:15 PM	4:00:00	LPRSA0189480	ABC013500				
4/29/58 9:00 PM	4/30/58 8:45 AM	11:45:00	LPRSA0189479	ABC013499				
5/7/58 1:00 PM	5/8/58 8:30 AM	19:30:00	LPRSA0189478	ABC013498				
10/22/58 7:30 PM	10/24/58 10:30 AM	39:00:00	LPRSA0189469	ABC013489				
10/25/58 6:30 PM	10/27/58 2:00 PM	43:30:00	LPRSA0189468	ABC013488				
11/28/58 10:15 PM	11/29/58 12:15 PM	14:00:00	LPRSA0189466	ABC013486				
3/6/59 9:15 AM	3/7/59 10:30 AM	25:15:00	LPRSA0189458	ABC013478				
5/13/59 7:30 PM	5/14/59 8:45 AM	13:15:00	LPRSA0189438	ABC013458				
6/2/59 6:00 PM	6/3/59 9:45 AM	15:45:00	LPRSA0189454	ABC013474				
8/5/59 11:15 AM	8/6/59 9:30 AM	22:15:00	LPRSA0189448	ABC013468				
8/9/59 5:15 AM	8/9/59 6:45 AM	1:30:00	LPRSA0189447	ABC013467				
8/31/59 1:45 PM	9/3/59 9:45 AM	68:00:00	LPRSA0189445	ABC013465				
10/1/59 1:30 PM	10/2/59 8:30 AM	19:00:00	LPRSA0189443	ABC013463				
10/9/59 12:00 PM	10/10/59 2:30 PM	26:30:00	LPRSA0189440	ABC013460				
10/24/59 10:45 AM	10/25/59 11:00 AM	24:15:00	LPRSA0189435	ABC013455				
11/24/59 4:45 PM	11/25/59 10:40 AM	17:55:00	LPRSA0189432	ABC013452				
12/7/59 1:00 AM	12/7/59 8:45 AM	7:45:00	LPRSA0189431	ABC013451				
12/12/59 7:15 PM	12/13/59 9:45 AM	14:30:00	LPRSA0189430	ABC013450				
12/29/59 12:20 AM	12/29/59 8:45 AM	8:25:00	LPRSA0189429	ABC013449				
2/6/60 6:30 AM	2/6/60 1:45 PM	7:15:00	LPRSA0189423	ABC013443				
2/11/60 6:00 AM	2/11/60 12:45 PM	6:45:00	LPRSA0189422	ABC013442				
2/18/60 11:15 PM	2/19/60 3:30 PM	16:15:00	LPRSA0189421	ABC013441				
2/26/60 12:10 AM	2/26/60 2:10 PM	14:00:00	LPRSA0189420	ABC013440				
4/3/60 10:30 PM	4/4/60 11:40 AM	13:10:00	LPRSA0189416	ABC013436				

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**Exhibit 2-4d. Documented PVSC Bypasses at 4th Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
7/14/60 1:15 PM	7/15/60 10:15 AM	21:00:00	LPRSA0189404	ABC013424				
10/20/60 8:50 AM	10/20/60 3:30 PM	6:40:00	LPRSA0189395	ABC013415				
11/10/60 8:45 AM	11/10/60 3:45 PM	7:00:00	LPRSA0189394	ABC013414				
12/12/60 2:00 PM	12/14/60 1:30 PM	47:30:00	LPRSA0189392	ABC013412				
12/21/60 8:50 AM	12/22/60 9:15 AM	24:25:00	LPRSA0189391	ABC013411				
1/1/61 10:00 AM	1/2/61 10:00 AM	24:00:00	LPRSA0189389	ABC013409				
3/9/61 12:45 PM	3/10/61 8:40 AM	19:55:00	LPRSA0189381	ABC013401				
3/14/61 4:15 AM	3/15/61 1:20 PM	33:05:00	LPRSA0189382	ABC013402				
3/23/61 1:05 PM	3/24/61 1:50 PM	24:45:00	LPRSA0189383	ABC013403				
4/10/61 10:10 AM	4/11/61 2:20 PM	28:10:00	LPRSA0189376	ABC013396				
4/13/61 6:40 AM	4/14/61 2:35 PM	31:55:00	LPRSA0189375	ABC013395				
4/16/61 12:40 PM	4/17/61 1:20 PM	24:40:00	LPRSA0189373	ABC013393				
4/18/61 3:05 PM	4/20/61 1:45 PM	46:40:00	LPRSA0189371	ABC013391				
4/24/61 9:30 AM	4/27/61 8:30 AM	71:00:00	LPRSA0189370	ABC013390				
7/15/61 8:20 PM	7/17/61 8:40 AM	36:20:00	LPRSA0189358	ABC013378				
7/20/61 8:30 AM	7/21/61 8:35 AM	24:05:00	LPRSA0189357	ABC013377				
8/3/61 12:20 PM	8/4/61 10:50 AM	22:30:00	LPRSA0189354	ABC013374				
8/21/61 2:45 PM	8/22/61 8:40 AM	17:55:00	LPRSA0189353	ABC013373				
8/23/61 10:55 AM	8/24/61 1:45 PM	26:50:00	LPRSA0189352	ABC013372				
9/19/61 4:00 PM	9/22/61 11:05 AM	67:05:00	LPRSA0189348	ABC013368				
11/24/61 10:15 AM	11/25/61 10:25 AM	24:10:00	LPRSA0189341	ABC013361				
12/18/61 9:20 AM	12/20/61 1:20 PM	52:00:00	LPRSA0189338	ABC013358				
12/28/61 10:20 AM	12/29/61 8:30 AM	22:10:00	LPRSA0189337	ABC013357				
1/6/62 12:20 PM	1/8/62 1:35 PM	49:15:00	LPRSA0189336	ABC013356				
1/15/62 4:35 PM	1/16/62 8:30 AM	15:55:00	LPRSA0189335	ABC013355				
1/26/62 3:30 PM	1/27/62 10:10 AM	18:40:00	LPRSA0189334	ABC013354				
2/24/62 6:20 AM	2/25/62 11:45 AM	29:25:00	LPRSA0189330	ABC013350				
2/26/62 11:10 AM	3/1/62 3:00 PM	75:50:00	LPRSA0189329	ABC013349				
3/6/62 10:45 AM	3/7/62 9:05 AM	22:20:00	LPRSA0189328	ABC013348				
3/12/62 8:05 AM	3/13/62 1:20 PM	29:15:00	LPRSA0189327	ABC013347				
3/21/62 1:35 PM	3/22/62 9:10 AM	19:35:00	LPRSA0189326	ABC013346				
4/1/62 6:00 AM	4/2/62 10:50 AM	28:50:00	LPRSA0189325	ABC013345				
4/7/62 3:20 PM	4/9/62 9:05 AM	41:45:00	LPRSA0189324	ABC013344				
4/9/62 4:05 PM	4/10/62 8:50 AM	16:45:00	LPRSA0189323	ABC013343				
6/5/62 10:30 PM	6/6/62 8:40 AM	10:10:00	LPRSA0189315	ABC013335				
6/13/62 2:05 PM	6/14/62 8:40 AM	18:35:00	LPRSA0189314	ABC013334				
6/26/62 5:40 PM	6/27/62 8:50 AM	15:10:00	LPRSA0189312	ABC013332				
7/18/62 2:25 PM	7/19/62 8:30 AM	18:05:00	LPRSA0189310	ABC013330				
8/7/62 2:20 PM	8/8/62 8:45 AM	18:25:00	LPRSA0189308	ABC013328				
8/9/62 8:00 PM	8/10/62 3:20 PM	19:20:00	LPRSA0189307	ABC013327				
8/10/62 10:55 PM	8/11/62 1:30 PM	14:35:00	LPRSA0189306	ABC013326				
8/17/62 6:30 PM	8/18/62 9:55 AM	15:25:00	LPRSA0189305	ABC013325				
8/21/62 11:40 AM	8/22/62 1:30 PM	25:50:00	LPRSA0189304	ABC013324				
8/28/62 5:40 AM	8/29/62 1:35 PM	31:55:00	LPRSA0189303	ABC013323				
9/5/62 11:20 AM	9/6/62 8:30 AM	21:10:00	LPRSA0189301	ABC013321				
9/17/62 6:25 PM	9/18/62 8:40 AM	14:15:00	LPRSA0189299	ABC013319				
9/27/62 9:45 AM	9/29/62 11:00 AM	49:15:00	LPRSA0189296	ABC013316				
10/5/62 5:00 AM	10/7/62 10:10 AM	53:10:00	LPRSA0189295	ABC013315				
10/23/62 11:45 AM	10/24/62 10:40 AM	22:55:00	LPRSA0189291	ABC013311				
10/25/62 11:15 PM	10/27/62 10:15 AM	35:00:00	LPRSA0189290	ABC013310				
10/30/62 2:30 PM	11/1/62 2:45 PM	48:15:00	LPRSA0189289	ABC013309				
11/3/62 10:20 AM	11/5/62 8:40 AM	46:20:00	LPRSA0189288	ABC013308				
11/9/62 2:45 PM	11/11/62 10:15 AM	43:30:00	LPRSA0189287	ABC013307				

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**Exhibit 2-4d. Documented PVSC Bypasses at 4th Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
11/13/62 3:35 PM	11/14/62 8:40 AM	17:05:00	LPRSA0189286	ABC013306				
11/18/62 1:15 PM	11/19/62 3:15 PM	26:00:00	LPRSA0189285	ABC013305				
11/21/62 10:30 PM	11/23/62 9:35 AM	35:05:00	LPRSA0189284	ABC013304				
12/5/62 8:50 AM	12/8/62 9:30 AM	72:40:00	LPRSA0189283	ABC013303				
12/22/62 11:05 AM	12/24/62 9:15 AM	46:10:00	LPRSA0189282	ABC013302				
12/29/62 8:20 PM	12/30/62 12:30 PM	16:10:00	LPRSA0189280	ABC013300				
* 1/1/63 12:00 AM	9/30/74 11:59 PM							
Subtotal		12868:35:00						

* Missing data.

Source: PVSC throw-out logs.

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**Exhibit 2-4d. Documented PVSC Bypasses at 4th Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
(1974-1975)							
10/16/74 4:00 AM	10/17/74 8:00 PM	40:00:00	LPRSA0195712				
12/2/74 1:00 AM	12/3/74 8:00 AM	31:00:00	LPRSA0195714				
12/8/74 1:00 PM	12/9/74 8:00 AM	19:00:00	LPRSA0195714				
12/16/74 11:00 AM	12/17/74 8:00 AM	21:00:00	LPRSA0195714				
1/1/75	1/1/75	0:00:00	LPRSA0196788				
1/9/75 6:00 AM	1/9/75 1:00 PM	7:00:00	LPRSA0195715				
1/13/75 10:00 AM	1/14/75 8:00 AM	22:00:00	LPRSA0195715				
1/18/75 3:00 PM	1/19/75 6:00 AM	15:00:00	LPRSA0195715				
1/29/75	1/29/75	5:00:00	LPRSA0196788	3.9	0.81	212	1,436
1/29/75 6:00 AM	1/29/75 3:00 PM	4:00:00	LPRSA0195715				
2/24/75	2/24/75	8:04:48	LPRSA0196788	4.7	1.58	212	2,797
2/24/75 5:00 AM	2/25/75 6:00 AM	16:55:12	LPRSA0195716				
3/12/75	3/12/75	5:15:00	LPRSA0196788	8.6	1.88	212	3,325
3/19/75	3/20/75	12:00:00	LPRSA0196788	9.4	4.70	212	8,308
3/19/75 4:00 PM	3/20/75 12:00 PM	8:00:00	LPRSA0195717				
4/3/75	4/3/75	6:45:00	LPRSA0196788	5.6	1.58	212	2,784
4/3/75 8:00 AM	4/3/75 5:00 PM	2:15:00	LPRSA0195718				
4/24/75	4/24/75	3:27:36	LPRSA0196788	1.7	0.25	212	433
4/24/75 4:00 AM	4/24/75 8:00 AM	0:32:24	LPRSA0195718				
4/24/75	4/25/75	1:34:48	LPRSA0196788	5.3	0.35	212	617
4/25/75 2:00 AM	4/25/75 9:00 AM	5:25:12	LPRSA0195718				
5/13/75	5/13/75	1:45:00	LPRSA0196788	5.6	0.41	212	722
5/13/75 10:00 PM	5/14/75 9:00 AM	9:15:00	LPRSA0195719				
6/1/75 7:00 AM	6/1/75 4:00 PM	9:00:00	LPRSA0195720				
6/5/75	6/6/75	12:05:24	LPRSA0196789	2.0	1.01	212	1,781
6/5/75 8:00 PM	6/6/75 11:00 AM	2:54:36	LPRSA0195720				
6/6/75	6/6/75	6:00:00	LPRSA0196789	17.8	4.45	212	7,866
6/6/75 3:00 PM	6/7/75 8:00 AM	11:00:00	LPRSA0195720				
6/12/75 10:00 AM	6/13/75 8:00 AM	22:00:00	LPRSA0195720				
7/4/75 4:00 AM	7/4/75 12:00 PM	8:00:00	LPRSA0195721				
7/7/75 8:00 AM	7/7/75 10:00 PM	14:00:00	LPRSA0195721				
7/9/75 6:00 PM	7/10/75 2:00 AM	8:00:00	LPRSA0195721				
7/13/75 11:00 AM	7/16/75 5:00 PM	78:00:00	LPRSA0195721				
7/25/75 2:00 AM	7/25/75 2:00 PM	12:00:00	LPRSA0195721				
9/23/75 12:00 AM	9/28/75 10:00 AM	130:00:00	LPRSA0195722				
* 10/1/75	12/31/04						
Subtotal		558:15:00			17.01		30,068
Estimated Mass/Bypass Time (lb/hr)							485
Estimated Bypassed Volume Rate (MG/hr)				0.275			

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

(2005-2014)

		Elapsed Time (hours)	Frequency of Overflows (#/yr)
1/1/2005	12/31/2005	461.60	36
1/1/2006	12/31/2006	639.35	48
1/1/2007	12/31/2007	401.86	21

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**Exhibit 2-4d. Documented PVSC Bypasses at 4th Avenue
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
1/1/2008	12/31/2008	597.55	44				
1/1/2009	12/31/2009	514.49	52				
1/1/2010	12/31/2010	470.02	39				
1/1/2011	12/31/2011	648.85	62				
1/1/2012	12/31/2012	165.77	35				
1/1/2013	12/31/2013	363.34	39				
1/1/2014	12/31/2014	363.34	39				
* 1/1/2015	9/30/2016						
Subtotal (2005-2014)		4626.17					
Average annual bypass time (hr)		462.62					

* Missing data.

Source: PVSC, NJPDES permit reports to NJDEP, CSO Regulator Events, 2008-2015.

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**Exhibit 2-4e. Documented PVSC Bypasses at Clay Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
(1950-1962)							
*	8/2/24 12:00 PM	10/3/50 11:59 PM	LPRSA0198629				
	10/4/50 10:00 PM	10/5/50 11:30 AM	13:30:00 LPRSA0188654	ABC012674			
	10/10/50 2:30 AM	10/10/50 8:30 AM	6:00:00 LPRSA0188652	ABC012672			
	10/12/50 1:30 PM	10/13/50 9:30 AM	20:00:00 LPRSA0188650	ABC012670			
	10/23/50 1:30 PM	10/24/50 9:00 AM	19:30:00 LPRSA0188648	ABC012668			
	11/20/50 6:00 PM	11/21/50 9:00 AM	15:00:00 LPRSA0188646	ABC012666			
	11/25/50 9:00 AM	11/25/50 1:00 PM	4:00:00 LPRSA0188643	ABC012663			
	12/4/50 12:30 PM	12/4/50 9:00 PM	8:30:00 LPRSA0188641	ABC012661			
	12/7/50 4:00 PM	12/8/50 11:30 AM	19:30:00 LPRSA0188637	ABC012657			
	12/15/50 10:30 PM	12/16/50 9:00 AM	10:30:00 LPRSA0188639	ABC012659			
	12/29/50 12:30 PM	12/30/50 11:30 AM	23:00:00 LPRSA0188635	ABC012655			
	1/7/51 5:00 PM	1/8/51 9:00 AM	16:00:00 LPRSA0188633	ABC012653			
	1/11/51 5:30 PM	1/12/51 8:30 AM	15:00:00 LPRSA0188619	ABC012639			
	1/14/51 6:00 PM	1/15/51 12:00 PM	18:00:00 LPRSA0188631	ABC012651			
	1/23/51 2:00 AM	1/24/51 2:00 PM	36:00:00 LPRSA0188621	ABC012641			
	1/25/51 4:00 PM	1/25/51 7:00 PM	3:00:00 LPRSA0188623	ABC012643			
	1/28/51 5:00 PM	1/29/51 8:30 AM	15:30:00 LPRSA0188625	ABC012645			
	1/29/51 7:30 PM	1/30/51 10:00 AM	14:30:00 LPRSA0188625	ABC012645			
	1/31/51 4:00 PM	2/2/51 10:00 AM	42:00:00 LPRSA0188628	ABC012648			
	2/7/51 11:00 AM	2/8/51 2:30 PM	27:30:00 LPRSA0188585	ABC012605			
	2/10/51 5:30 AM	2/10/51 12:00 PM	6:30:00 LPRSA0188588	ABC012608			
	2/11/51 6:00 PM	2/13/51 1:30 PM	43:30:00 LPRSA0188588	ABC012608			
	2/13/51 7:45 PM	2/14/51 10:00 AM	14:15:00 LPRSA0188588	ABC012608			
	2/14/51 5:45 PM	2/15/51 9:30 AM	15:45:00 LPRSA0188588	ABC012608			
	2/17/51 4:00 AM	2/18/51 11:30 AM	31:30:00 LPRSA0188588	ABC012608			
	2/19/51 5:00 PM	2/20/51 2:30 PM	21:30:00 LPRSA0188596	ABC012616			
	2/22/51 10:30 AM	2/22/51 11:45 AM	1:15:00 LPRSA0188596	ABC012616			
	2/23/51 8:30 AM	2/23/51 10:00 AM	1:30:00 LPRSA0188596	ABC012616			
	3/1/51 1:00 PM	3/2/51 10:00 AM	21:00:00 LPRSA0188604	ABC012624			
	3/3/51 3:00 PM	3/5/51 10:30 AM	43:30:00 LPRSA0188606	ABC012626			
	3/13/51 4:30 PM	3/14/51 3:00 PM	22:30:00 LPRSA0188609	ABC012629			
	3/16/51 4:00 PM	3/19/51 9:30 AM	65:30:00 LPRSA0188612	ABC012632			
	3/19/51 5:00 PM	3/20/51 12:00 PM	19:00:00 LPRSA0188616	ABC012636			
*	3/22/51 12:00 AM	12/31/51 11:59 PM					
	2/17/52 3:30 AM	2/18/52 9:00 AM	29:30:00 LPRSA0189755	ABC013775			
	2/20/52 6:00 PM	2/21/52 2:00 PM	20:00:00 LPRSA0189754	ABC013774			
	2/29/52 9:00 PM	3/3/52 11:00 AM	62:00:00 LPRSA0189753	ABC013773			
	3/3/52 5:30 PM	3/5/52 2:30 PM	45:00:00 LPRSA0189753	ABC013773			
	3/11/52 5:00 AM	3/17/52 2:00 PM	153:00:00 LPRSA0189752	ABC013772			
	3/19/52 10:30 AM	3/20/52 2:00 PM	27:30:00 LPRSA0189751	ABC013771			
	3/22/52 5:00 PM	3/25/52 10:30 AM	65:30:00 LPRSA0189750	ABC013770			
	4/4/52 5:30 PM	4/6/52 11:00 AM	41:30:00 LPRSA0189749	ABC013769			
	4/14/52 4:00 AM	4/16/52 11:00 AM	55:00:00 LPRSA0189748	ABC013768			
	4/23/52 6:00 PM	4/24/52 11:00 AM	17:00:00 LPRSA0189747	ABC013767			
	4/25/52 11:00 AM	4/25/52 8:00 PM	9:00:00 LPRSA0189744	ABC013764			
	4/26/52 2:30 PM	4/28/52 5:30 PM	51:00:00 LPRSA0189744	ABC013764			
	4/29/52 3:00 PM	5/7/52 2:00 PM	191:00:00 LPRSA0189744	ABC013764			
	5/11/52 10:00 PM	5/13/52 11:30 AM	37:30:00 LPRSA0189743	ABC013763			
	5/18/52 8:00 AM	5/23/52 2:30 PM	126:30:00 LPRSA0189741	ABC013761			
	5/13/52 3:30 PM	5/14/52 10:00 AM	18:30:00 LPRSA0189743	ABC013763			
	5/25/52 9:30 AM	5/27/52 9:30 AM	48:00:00 LPRSA0189740	ABC013760			

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**Exhibit 2-4e. Documented PVSC Bypasses at Clay Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
5/29/52 3:30 PM	6/3/52 10:30 AM	115:00:00	LPRSA0189738	ABC013758				
6/3/52 11:45 AM	6/6/52 10:00 AM	70:15:00	LPRSA0189736	ABC013756				
6/9/52 9:15 AM	6/14/52 9:45 AM	120:30:00	LPRSA0189737	ABC013757				
6/17/52 5:30 PM	6/18/52 11:30 AM	18:00:00	LPRSA0189735	ABC013755				
6/19/52 3:15 PM	6/20/52 9:45 AM	18:30:00	LPRSA0189734	ABC013754				
6/27/52 4:10 PM	6/28/52 8:45 AM	16:35:00	LPRSA0189729	ABC013749				
6/29/52 1:00 AM	6/30/52 10:00 AM	33:00:00	LPRSA0189728	ABC013748				
7/8/52 4:15 PM	7/10/52 10:00 AM	41:45:00	LPRSA0189730	ABC013750				
7/21/52 4:30 PM	7/22/52 10:30 AM	18:00:00	LPRSA0189725	ABC013745				
7/31/52 5:00 PM	8/1/52 10:00 AM	17:00:00	LPRSA0189724	ABC013744				
8/2/52 4:15 PM	8/3/52 9:30 AM	17:15:00	LPRSA0189725	ABC013745				
8/6/52 3:15 PM	8/11/52 9:15 AM	114:00:00	LPRSA0189715	ABC013735				
8/11/52 5:30 PM	8/12/52 9:00 AM	15:30:00	LPRSA0189719	ABC013739				
8/12/52 5:15 PM	8/13/52 9:00 AM	15:45:00	LPRSA0189721	ABC013741				
8/13/52 5:00 PM	8/14/52 9:00 AM	16:00:00	LPRSA0189720	ABC013742				
8/15/52 5:00 PM	8/17/52 9:00 AM	40:00:00	LPRSA0189714	ABC013734				
8/21/52 4:30 PM	8/22/52 10:00 AM	17:30:00	LPRSA0189713	ABC013733				
8/30/52 10:00 AM	9/2/52 9:00 AM	71:00:00	LPRSA0189712	ABC013732				
9/2/52 5:00 PM	9/3/52 2:00 PM	21:00:00	LPRSA0189711	ABC013731				
9/15/52 4:15 PM	9/17/52 5:00 PM	48:45:00	LPRSA0189709	ABC013729				
9/18/52 1:00 PM	9/20/52 9:00 AM	44:00:00	LPRSA0189710	ABC013730				
9/23/52 10:30 AM	9/23/52 2:00 PM	3:30:00	LPRSA0189708	ABC013728				
10/2/52 7:00 PM	10/3/52 1:30 PM	18:30:00	LPRSA0189707	ABC013727				
10/28/52 5:30 PM	10/29/52 9:00 AM	15:30:00	LPRSA0189706	ABC013726				
11/2/52 9:15 AM	11/2/52 2:15 PM	5:00:00	LPRSA0189705	ABC013725				
11/3/52 2:00 PM	11/4/52 9:00 AM	19:00:00	LPRSA0189703	ABC013723				
11/10/52 4:30 PM	11/11/52 9:00 AM	16:30:00	LPRSA0189704	ABC013724				
11/14/52 1:30 PM	12/1/52 1:30 PM	408:00:00	LPRSA0189701	ABC013721				
12/2/52 2:00 PM	12/5/52 6:00 PM	76:00:00	LPRSA0189702	ABC013722				
12/9/52 8:00 AM	1/18/53 2:30 PM	966:30:00	LPRSA0189655	ABC013675				
1/21/53 3:00 PM	1/22/53 9:00 AM	18:00:00	LPRSA0189656	ABC013676				
1/24/53 10:00 AM	1/24/53 4:00 PM	6:00:00	LPRSA0189657	ABC013677				
2/15/53 11:00 AM	2/15/53 4:30 PM	5:30:00	LPRSA0189659	ABC013679				
2/21/53 9:00 AM	2/21/53 2:00 PM	5:00:00	LPRSA0189660	ABC013680				
2/25/53 9:00 AM	3/10/53 6:00 PM	321:00:00	LPRSA0189661	ABC013681				
3/15/53 2:00 PM	3/16/53 1:30 PM	23:30:00	LPRSA0189667	ABC013687				
3/19/53 1:30 AM	3/19/53 4:30 PM	15:00:00	LPRSA0189667	ABC013687				
3/24/53 10:00 AM	3/25/53 10:15 AM	24:15:00	LPRSA0189667	ABC013687				
3/25/53 4:00 PM	3/25/53 8:00 PM	4:00:00	LPRSA0189667	ABC013687				
3/30/53 3:00 PM	3/31/53 9:45 AM	18:45:00	LPRSA0189667	ABC013687				
4/9/53 4:30 PM	4/10/53 2:00 PM	21:30:00	LPRSA0189667	ABC013687				
4/16/53 10:30 AM	4/17/53 5:30 PM	31:00:00	LPRSA0189667	ABC013687				
4/18/53 5:30 AM	4/20/53 10:00 AM	52:30:00	LPRSA0189667	ABC013687				
4/20/53 5:00 PM	5/1/53 2:15 PM	261:15:00	LPRSA0189667	ABC013687				
5/8/53 10:15 PM	5/9/53 9:45 AM	11:30:00	LPRSA0189667	ABC013687				
5/13/53 11:30 PM	5/22/53 7:00 PM	211:30:00	LPRSA0189667	ABC013687				
5/25/53 10:30 AM	5/25/53 3:00 PM	4:30:00	LPRSA0189667	ABC013687				
5/27/53 10:15 AM	5/28/53 2:00 PM	27:45:00	LPRSA0189667	ABC013687				
6/13/53 5:15 PM	6/14/53 2:15 PM	21:00:00	LPRSA0189674	ABC013694				
6/18/53 5:00 PM	6/19/53 9:45 AM	16:45:00	LPRSA0189676	ABC013696				
6/22/53 10:15 AM	7/2/53 2:15 PM	244:00:00	LPRSA0189677	ABC013697				
7/6/53 8:15 PM	7/7/53 8:45 AM	12:30:00	LPRSA0189681	ABC013701				
7/20/53 9:40 PM	7/21/53 9:15 AM	11:35:00	LPRSA0189682	ABC013702				
7/21/53 4:00 PM	7/22/53 8:30 AM	16:30:00	LPRSA0189683	ABC013703				

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**Exhibit 2-4e. Documented PVSC Bypasses at Clay Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
7/23/53 8:55 AM	7/23/53 3:30 PM	6:35:00	LPRSA0189684	ABC013704				
8/10/53 1:15 AM	8/10/53 10:45 AM	9:30:00	LPRSA0189685	ABC013705				
8/14/53 1:30 PM	8/15/53 8:45 AM	19:15:00	LPRSA0189686	ABC013706				
9/16/53 2:00 AM	9/16/53 8:30 AM	6:30:00	LPRSA0189688	ABC013708				
10/6/53 6:30 PM	10/7/53 9:45 AM	15:15:00	LPRSA0189689	ABC013709				
10/20/53 8:30 AM	10/28/53 2:30 PM	198:00:00	LPRSA0189690	ABC013710				
10/29/53 2:30 PM	10/29/53 4:45 PM	2:15:00	LPRSA0189693	ABC013713				
10/29/53 7:15 PM	10/30/53 9:45 AM	14:30:00	LPRSA0189694	ABC013714				
11/7/53 7:30 AM	11/8/53 11:00 AM	27:30:00	LPRSA0189695	ABC013715				
* 11/16/53 10:00 AM			LPRSA0189653	ABC013673				
11/23/53 10:15 AM	11/23/53 4:00 PM	5:45:00	LPRSA0189698	ABC013718				
11/25/53 10:15 AM	11/26/53 9:15 AM	23:00:00	LPRSA0189652	ABC013672				
11/30/53 10:15 AM	12/5/53 8:00 AM	117:45:00	LPRSA0189651	ABC013671				
12/6/53 9:45 AM	12/7/53 10:00 AM	24:15:00	LPRSA0189650	ABC013670				
12/9/53 4:45 PM	12/10/53 4:45 PM	24:00:00	LPRSA0189649	ABC013669				
12/12/53 4:14 PM	12/13/53 8:45 AM	16:31:00	LPRSA0189648	ABC013668				
12/14/53 6:30 AM	12/14/53 3:15 PM	8:45:00	LPRSA0189647	ABC013667				
12/28/53 5:15 PM	12/29/53 1:45 PM	20:30:00	LPRSA0189646	ABC013666				
1/14/54 5:00 PM	1/18/54 10:00 AM	89:00:00	LPRSA0189592	ABC013612				
1/18/54 3:00 PM	1/22/54 10:00 AM	91:00:00	LPRSA0189591	ABC013611				
1/22/54 2:30 PM	1/25/54 10:30 AM	68:00:00	LPRSA0189590	ABC013610				
1/25/54 1:30 PM	2/2/54 10:15 AM	188:45:00	LPRSA0189590	ABC013610				
2/3/54 1:45 PM	2/4/54 9:45 AM	20:00:00	LPRSA0189589	ABC013609				
2/8/54 5:45 PM	2/9/54 9:45 AM	16:00:00	LPRSA0189588	ABC013608				
2/15/54 2:15 PM	2/19/54 1:30 PM	95:15:00	LPRSA0189587	ABC013607				
2/21/54 5:30 PM	2/22/54 9:00 AM	15:30:00	LPRSA0189586	ABC013606				
2/23/54 12:15 PM	2/27/54 9:00 AM	92:45:00	LPRSA0189621	ABC013641				
3/1/54 11:15 AM	3/5/54 2:00 PM	98:45:00	LPRSA0189619	ABC013639				
3/13/54 3:15 PM	3/15/54 9:45 AM	42:30:00	LPRSA0189618	ABC013638				
3/19/54 4:45 PM	3/20/54 8:55 AM	16:10:00	LPRSA0189617	ABC013637				
3/25/54 10:15 AM	3/26/54 8:30 AM	22:15:00	LPRSA0189616	ABC013636				
4/8/54 2:00 PM	4/9/54 9:45 AM	19:45:00	LPRSA0189613	ABC013633				
4/13/54 12:45 PM	4/13/54 3:30 PM	2:45:00	LPRSA0189623	ABC013643				
4/16/54 1:20 PM	4/18/54 10:20 AM	45:00:00	LPRSA0189632	ABC013652				
4/19/54 4:00 PM	4/21/54 4:15 PM	48:15:00	LPRSA0189615	ABC013635				
4/23/54 1:45 PM	4/25/54 9:45 AM	44:00:00	LPRSA0189614	ABC013634				
4/28/54 3:30 PM	4/29/54 9:45 AM	18:15:00	LPRSA0189612	ABC013632				
5/3/54 11:00 AM	5/26/54 11:00 AM	552:00:00	LPRSA0189631	ABC013651				
6/1/54 12:00 PM	6/9/54 10:15 AM	190:15:00	LPRSA0189630	ABC013650				
6/10/54 3:15 PM	6/11/54 9:30 AM	18:15:00	LPRSA0189629	ABC013649				
7/4/54 12:30 PM	7/6/54 9:30 AM	45:00:00	LPRSA0189625	ABC013645				
7/7/54 5:00 PM	7/8/54 10:00 AM	17:00:00	LPRSA0189624	ABC013644				
7/14/54 4:45 PM	7/15/54 12:15 PM	19:30:00	LPRSA0189634	ABC013654				
7/22/54 3:45 PM	7/23/54 9:15 AM	17:30:00	LPRSA0189633	ABC013653				
8/3/54 9:45 AM	8/4/54 9:45 AM	24:00:00	LPRSA0189620	ABC013640				
8/9/54 9:30 AM	8/11/54 10:00 AM	48:30:00	LPRSA0189622	ABC013642				
8/19/54 11:15 PM	8/20/54 10:30 AM	11:15:00	LPRSA0189611	ABC013631				
8/20/54 5:00 PM	8/22/54 9:00 AM	40:00:00	LPRSA0189610	ABC013630				
8/25/54 5:15 PM	8/26/54 9:45 AM	16:30:00	LPRSA0189609	ABC013629				
8/30/54 5:15 PM	9/1/54 10:00 AM	40:45:00	LPRSA0189608	ABC013628				
9/8/54 3:00 PM	9/9/54 9:45 AM	18:45:00	LPRSA0189607	ABC013627				
9/10/54 2:00 PM	9/12/54 9:45 AM	43:45:00	LPRSA0189606	ABC013626				
9/14/54 5:00 PM	9/18/54 1:30 PM	92:30:00	LPRSA0189605	ABC013625				
10/4/54 9:30 AM	10/7/54 9:30 AM	72:00:00	LPRSA0189604	ABC013624				

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**Exhibit 2-4e. Documented PVSC Bypasses at Clay Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
10/15/54 11:45 AM	10/16/54 7:15 AM	19:30:00	LPRSA0189603	ABC013623				
10/27/54 5:00 PM	10/28/54 10:00 AM	17:00:00	LPRSA0189602	ABC013622				
10/29/54 10:00 AM	10/30/54 9:30 AM	23:30:00	LPRSA0189601	ABC013621				
11/2/54 1:30 PM	11/4/54 9:45 AM	44:15:00	LPRSA0189600	ABC013620				
11/8/54 1:45 PM	11/9/54 1:45 PM	24:00:00	LPRSA0189599	ABC013619				
11/15/54 10:15 AM	12/2/54 3:00 AM	400:45:00	LPRSA0189597	ABC013617				
12/9/54 2:30 PM	12/10/54 1:45 PM	23:15:00	LPRSA0189596	ABC013616				
12/14/54 10:00 AM	12/15/54 1:30 PM	27:30:00	LPRSA0189595	ABC013615				
12/16/54 3:30 PM	12/16/54 8:45 PM	5:15:00	LPRSA0189594	ABC013614				
12/29/54 1:30 PM	12/30/54 2:15 PM	24:45:00	LPRSA0189585	ABC013605				
1/6/55 2:30 PM	1/7/55 9:45 AM	19:15:00	LPRSA0189582	ABC013602				
1/28/55 10:15 AM	2/11/55 4:45 PM	342:30:00	LPRSA0189580	ABC013600				
2/14/55 3:45 PM	2/15/55 5:30 PM	25:45:00	LPRSA0189580	ABC013600				
2/21/55 2:00 PM	2/25/55 4:45 PM	98:45:00	LPRSA0189579	ABC013599				
2/28/55 1:15 PM	3/9/55 10:15 AM	213:00:00	LPRSA0189579	ABC013599				
3/7/55 2:15 PM	3/7/55 4:45 PM	2:30:00	LPRSA0189578	ABC013598				
3/21/55 3:30 PM	3/22/55 2:30 PM	23:00:00	LPRSA0189577	ABC013597				
3/28/55 2:00 PM	3/30/55 5:00 PM	51:00:00	LPRSA0189576	ABC013596				
4/6/55 2:00 PM	4/7/55 5:00 PM	27:00:00	LPRSA0189575	ABC013595				
4/12/55 3:00 PM	4/14/55 2:00 PM	47:00:00	LPRSA0189574	ABC013594				
5/31/55 1:45 PM	5/31/55 6:45 PM	5:00:00	LPRSA0189572	ABC013592				
6/21/55 11:45 PM	6/22/55 9:00 AM	9:15:00	LPRSA0189571	ABC013591				
8/8/55 12:00 AM	8/8/55 8:45 AM	8:45:00	LPRSA0189570	ABC013590				
8/11/55 8:00 PM	8/14/55 9:15 AM	61:15:00	LPRSA0189569	ABC013589				
8/15/55 5:30 PM	8/16/55 3:15 PM	21:45:00	LPRSA0189568	ABC013588				
8/18/55 4:45 PM	8/20/55 9:45 AM	41:00:00	LPRSA0189567	ABC013587				
8/21/55 10:30 PM	8/24/55 1:15 PM	62:45:00	LPRSA0189566	ABC013586				
8/24/55 3:45 PM	8/25/55 9:45 AM	18:00:00	LPRSA0189565	ABC013585				
8/25/55 4:45 PM	8/26/55 10:15 AM	17:30:00	LPRSA0189564	ABC013584				
9/24/55 6:00 AM	9/26/55 9:00 AM	51:00:00	LPRSA0189563	ABC013583				
10/6/55 9:00 AM	10/7/55 1:45 PM	28:45:00	LPRSA0189562	ABC013582				
10/14/55 9:45 AM	10/15/55 3:45 PM	30:00:00	LPRSA0189561	ABC013581				
10/16/55 3:30 PM	10/25/55 10:30 AM	211:00:00	LPRSA0189561	ABC013581				
10/30/55 10:30 AM	11/1/55 2:00 PM	51:30:00	LPRSA0189560	ABC013580				
11/10/55 4:30 PM	11/12/55 9:15 AM	40:45:00	LPRSA0189559	ABC013579				
11/16/55 10:00 AM	11/18/55 10:15 AM	48:15:00	LPRSA0189558	ABC013578				
1/30/56 1:45 PM	1/31/56 9:00 AM	19:15:00	LPRSA0189556	ABC013576				
2/2/56 12:30 PM	2/3/56 9:00 AM	20:30:00	LPRSA0189555	ABC013575				
2/6/56 4:30 PM	2/7/56 1:15 PM	20:45:00	LPRSA0189554	ABC013574				
2/18/56 9:15 AM	2/19/56 8:45 AM	23:30:00	LPRSA0189553	ABC013573				
3/8/56 2:30 AM	3/9/56 9:15 AM	30:45:00	LPRSA0189552	ABC013572				
3/14/56 9:30 AM	3/15/56 9:15 AM	23:45:00	LPRSA0189551	ABC013571				
3/21/56 3:35 PM	3/23/56 9:30 AM	41:55:00	LPRSA0189549	ABC013569				
3/29/56 5:00 PM	3/30/56 9:20 AM	16:20:00	LPRSA0189547	ABC013567				
4/7/56 2:50 AM	4/9/56 2:00 PM	59:10:00	LPRSA0189546	ABC013566				
4/11/56 4:55 PM	4/12/56 8:40 AM	15:45:00	LPRSA0189545	ABC013565				
5/2/56 9:50 PM	5/3/56 9:30 AM	11:40:00	LPRSA0189544	ABC013564				
6/2/56 3:30 PM	6/3/56 12:15 PM	20:45:00	LPRSA0189543	ABC013563				
6/27/56 3:15 PM	6/27/56 6:30 PM	3:15:00	LPRSA0189542	ABC013562				
7/16/56 2:45 PM	7/17/56 9:15 AM	18:30:00	LPRSA0189541	ABC013561				
7/21/56 10:00 AM	7/21/56 10:05 PM	12:05:00	LPRSA0189540	ABC013560				
7/27/56 10:30 AM	7/28/56 8:20 AM	21:50:00	LPRSA0189539	ABC013559				
8/6/56 4:45 PM	8/7/56 8:30 AM	15:45:00	LPRSA0189538	ABC013558				

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**Exhibit 2-4e. Documented PVSC Bypasses at Clay Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source	Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
8/21/56 4:45 AM	8/21/56 4:30 PM	11:45:00	LPRSA0189537	ABC013557				
9/6/56 7:00 PM	9/7/56 8:45 AM	13:45:00	LPRSA0189536	ABC013556				
9/7/56 10:45 AM	9/8/56 12:30 PM	25:45:00	LPRSA0189535	ABC013555				
9/27/56 4:15 PM	9/28/56 8:30 AM	16:15:00	LPRSA0189534	ABC013554				
10/22/56 10:30 PM	10/23/56 9:00 AM	10:30:00	LPRSA0189533	ABC013553				
10/31/56 12:00 PM	10/31/56 7:45 PM	7:45:00	LPRSA0189532	ABC013552				
11/1/56 10:30 AM	11/4/56 12:00 PM	73:30:00	LPRSA0189532	ABC013552				
11/18/56 2:30 AM	11/18/56 11:15 AM	8:45:00	LPRSA0189531	ABC013551				
11/22/56 12:45 AM	11/22/56 8:15 AM	7:30:00	LPRSA0189530	ABC013550				
12/9/56 3:15 PM	12/10/56 8:45 AM	17:30:00	LPRSA0189529	ABC013549				
12/14/56 8:30 AM	12/17/56 8:00 AM	71:30:00	LPRSA0189528	ABC013548				
12/22/56 10:30 PM	12/23/56 10:15 AM	11:45:00	LPRSA0189527	ABC013547				
1/23/57 4:00 AM	1/23/57 2:15 PM	10:15:00	LPRSA0189498	ABC013518				
2/9/57 2:15 PM	2/10/57 9:00 AM	18:45:00	LPRSA0189497	ABC013517				
2/26/57 4:00 PM	2/27/57 1:00 PM	21:00:00	LPRSA0189496	ABC013516				
3/1/57 3:30 PM	3/2/57 10:45 AM	19:15:00	LPRSA0189524	ABC013544				
3/8/57 9:45 AM	3/10/57 10:00 AM	48:15:00	LPRSA0189523	ABC013543				
3/19/57 9:45 PM	3/21/57 9:00 AM	35:15:00	LPRSA0189521	ABC013541				
4/2/57 8:00 AM	4/2/57 3:30 PM	7:30:00	LPRSA0189520	ABC013540				
4/4/57 9:55 PM	4/5/57 11:30 AM	13:35:00	LPRSA0189519	ABC013539				
4/5/57 3:00 PM	4/6/57 1:35 PM	22:35:00	LPRSA0189518	ABC013538				
4/9/57 9:30 AM	4/9/57 4:15 PM	6:45:00	LPRSA0189516	ABC013536				
4/10/57 9:30 AM	4/10/57 4:15 PM	6:45:00	LPRSA0189515	ABC013535				
4/11/57 8:45 AM	4/11/57 4:15 PM	7:30:00	LPRSA0189514	ABC013534				
4/12/57 8:45 AM	4/12/57 4:30 PM	7:45:00	LPRSA0189513	ABC013533				
4/18/57 10:15 PM	4/19/57 1:45 PM	15:30:00	LPRSA0189512	ABC013532				
4/23/57 10:00 AM	4/23/57 3:45 PM	5:45:00	LPRSA0189511	ABC013531				
5/14/57 10:45 PM	5/15/57 12:30 PM	13:45:00	LPRSA0189508	ABC013528				
* 5/16/57 12:00 AM	8/25/57 11:59 PM							
8/26/57 1:45 AM	8/27/57 8:15 AM	30:30:00	LPRSA0189507	ABC013527				
9/10/57 11:00 PM	9/11/57 9:00 AM	10:00:00	LPRSA0189506	ABC013526				
9/17/57 12:15 AM	9/17/57 10:30 AM	10:15:00	LPRSA0189505	ABC013525				
* 9/18/57 12:00 AM	12/19/57 11:59 PM							
11/30/57 1:00 PM	11/30/57 9:00 PM	8:00:00	LPRSA0189503	ABC013523				
12/9/57 12:00 PM	12/9/57 2:00 PM	2:00:00	LPRSA0189502	ABC013522				
12/20/57 4:15 PM	12/21/57 10:30 AM	18:15:00	LPRSA0189501	ABC013521				
12/26/57 11:20 AM	12/26/57 4:00 PM	4:40:00	LPRSA0189500	ABC013520				
1/14/58 7:30 PM	1/15/58 9:00 AM	13:30:00	LPRSA0189494	ABC013514				
1/22/58 12:05 AM	1/22/58 10:15 AM	10:10:00	LPRSA0189492	ABC013512				
2/7/58 4:05 PM	2/8/58 9:00 AM	16:55:00	LPRSA0189489	ABC013509				
2/27/58 3:45 PM	2/28/58 2:00 PM	22:15:00	LPRSA0189488	ABC013508				
4/6/58 3:00 PM	4/7/58 9:00 AM	18:00:00	LPRSA0189483	ABC013503				
4/11/58 3:30 PM	4/12/58 3:30 PM	24:00:00	LPRSA0189482	ABC013502				
4/28/58 8:15 AM	4/28/58 3:15 PM	7:00:00	LPRSA0189480	ABC013500				
4/29/58 8:30 PM	4/30/58 9:00 AM	12:30:00	LPRSA0189479	ABC013499				
5/6/58 9:30 PM	5/7/58 8:30 AM	11:00:00	LPRSA0189478	ABC013498				
5/7/58 11:30 AM	5/8/58 4:00 PM	28:30:00	LPRSA0189478	ABC013498				
8/25/58 2:00 PM	8/26/58 8:30 AM	18:30:00	LPRSA0189472	ABC013492				
10/1/58 2:00 PM	10/2/58 8:30 AM	18:30:00	LPRSA0189470	ABC013490				
10/22/58 8:00 PM	10/24/58 9:15 AM	37:15:00	LPRSA0189469	ABC013489				
10/25/58 5:45 PM	10/27/58 2:45 PM	45:00:00	LPRSA0189468	ABC013488				
11/28/58 8:45 PM	11/29/58 10:45 AM	14:00:00	LPRSA0189466	ABC013486				

ADR CONFIDENTIAL

NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

**Exhibit 2-4e. Documented PVSC Bypasses at Clay Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
3/6/59 9:45 AM	3/7/59 11:00 AM	25:15:00	LPRSA0189458	ABC013478				
5/13/59 7:45 PM	5/14/59 9:00 AM	13:15:00	LPRSA0189438	ABC013458				
5/22/59 4:45 PM	5/22/59 8:00 PM	3:15:00	LPRSA0189439	ABC013459				
6/2/59 5:45 PM	6/3/59 8:15 AM	14:30:00	LPRSA0189454	ABC013474				
8/5/59 10:45 AM	8/6/59 9:00 AM	22:15:00	LPRSA0189448	ABC013468				
8/9/59 5:30 AM	8/10/59 10:00 AM	28:30:00	LPRSA0189447	ABC013467				
8/31/59 1:30 PM	9/3/59 8:30 AM	67:00:00	LPRSA0189445	ABC013465				
10/1/59 1:15 PM	10/1/59 3:45 PM	2:30:00	LPRSA0189443	ABC013463				
10/9/59 12:15 PM	10/10/59 3:00 PM	26:45:00	LPRSA0189440	ABC013460				
10/24/59 11:30 AM	10/25/59 11:45 AM	24:15:00	LPRSA0189435	ABC013455				
11/24/59 4:30 PM	11/25/59 10:25 AM	17:55:00	LPRSA0189432	ABC013452				
12/7/59 1:15 AM	12/8/59 10:20 AM	33:05:00	LPRSA0189431	ABC013451				
12/12/59 7:00 PM	12/13/59 9:15 AM	14:15:00	LPRSA0189430	ABC013450				
12/29/59 12:00 AM	12/29/59 9:45 AM	9:45:00	LPRSA0189429	ABC013449				
1/3/60 10:30 AM	1/4/60 9:00 AM	22:30:00	LPRSA0189427	ABC013447				
1/13/60 11:30 AM	1/14/60 8:45 AM	21:15:00	LPRSA0189426	ABC013446				
2/6/60 6:15 AM	2/6/60 1:30 PM	7:15:00	LPRSA0189423	ABC013443				
2/18/60 11:00 PM	2/19/60 3:15 PM	16:15:00	LPRSA0189421	ABC013441				
2/25/60 11:30 PM	2/26/60 1:30 PM	14:00:00	LPRSA0189420	ABC013440				
3/17/60 3:45 PM	3/18/60 8:20 AM	16:35:00	LPRSA0189418	ABC013438				
4/3/60 10:10 PM	4/4/60 11:25 AM	13:15:00	LPRSA0189416	ABC013436				
4/18/60 1:00 PM	4/18/60 3:45 PM	2:45:00	LPRSA0189412	ABC013432				
7/14/60 1:00 PM	7/15/60 10:00 AM	21:00:00	LPRSA0189404	ABC013424				
7/30/60 10:10 AM	7/31/60 9:20 AM	23:10:00	LPRSA0189402	ABC013422				
8/19/60 8:30 AM	8/20/60 9:30 AM	25:00:00	LPRSA0189399	ABC013419				
9/12/60 12:30 AM	9/13/60 9:10 AM	32:40:00	LPRSA0189397	ABC013417				
9/19/60 10:50 AM	9/21/60 9:30 PM	58:40:00	LPRSA0189396	ABC013416				
10/20/60 9:15 AM	10/21/60 8:30 AM	23:15:00	LPRSA0189395	ABC013415				
11/10/60 8:30 AM	11/10/60 3:30 PM	7:00:00	LPRSA0189394	ABC013414				
12/12/60 12:20 PM	12/14/60 12:30 PM	48:10:00	LPRSA0189392	ABC013412				
12/21/60 9:15 AM	12/22/60 9:30 AM	24:15:00	LPRSA0189391	ABC013411				
1/1/61 10:30 AM	1/2/61 10:40 AM	24:10:00	LPRSA0189389	ABC013409				
3/9/61 12:55 PM	3/10/61 9:10 AM	20:15:00	LPRSA0189381	ABC013401				
3/14/61 4:45 AM	3/15/61 1:35 PM	32:50:00	LPRSA0189382	ABC013402				
3/23/61 12:45 PM	3/24/61 1:30 PM	24:45:00	LPRSA0189383	ABC013403				
4/10/61 10:30 AM	4/11/61 2:40 PM	28:10:00	LPRSA0189376	ABC013396				
4/13/61 6:25 AM	4/14/61 2:15 PM	31:50:00	LPRSA0189375	ABC013395				
4/16/61 12:25 PM	4/17/61 1:00 PM	24:35:00	LPRSA0189373	ABC013393				
4/18/61 2:45 PM	4/20/61 2:00 PM	47:15:00	LPRSA0189371	ABC013391				
4/24/61 9:15 AM	4/27/61 8:50 AM	71:35:00	LPRSA0189370	ABC013390				
7/15/61 8:00 PM	7/17/61 9:00 AM	37:00:00	LPRSA0189358	ABC013378				
7/20/61 8:50 AM	7/21/61 8:50 AM	24:00:00	LPRSA0189357	ABC013377				
8/3/61 12:00 PM	8/4/61 10:30 AM	22:30:00	LPRSA0189354	ABC013374				
8/21/61 2:30 PM	8/22/61 9:00 AM	18:30:00	LPRSA0189353	ABC013373				
8/23/61 10:40 AM	8/24/61 1:30 PM	26:50:00	LPRSA0189352	ABC013372				
9/15/61 10:30 AM	9/15/61 2:45 PM	4:15:00	LPRSA0189349	ABC013369				
9/19/61 3:15 PM	9/22/61 10:50 AM	67:35:00	LPRSA0189348	ABC013368				
11/24/61 9:45 AM	11/25/61 10:10 AM	24:25:00	LPRSA0189341	ABC013361				
12/18/61 9:40 AM	12/20/61 1:00 PM	51:20:00	LPRSA0189338	ABC013358				
12/28/61 10:05 AM	12/29/61 8:50 AM	22:45:00	LPRSA0189337	ABC013357				
1/6/62 12:00 PM	1/8/62 1:15 PM	49:15:00	LPRSA0189336	ABC013356				
1/15/62 4:15 PM	1/16/62 8:45 AM	16:30:00	LPRSA0189335	ABC013355				

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NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

**Exhibit 2-4e. Documented PVSC Bypasses at Clay Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
1/26/62 3:15 PM	1/27/62 9:45 AM	18:30:00	LPRSA0189334	ABC013354				
2/24/62 6:05 AM	2/25/62 11:30 AM	29:25:00	LPRSA0189330	ABC013350				
2/26/62 10:50 AM	3/1/62 8:20 AM	69:30:00	LPRSA0189329	ABC013349				
3/6/62 10:30 AM	3/7/62 8:45 AM	22:15:00	LPRSA0189328	ABC013348				
3/12/62 7:50 AM	3/13/62 1:00 PM	29:10:00	LPRSA0189327	ABC013347				
3/21/62 1:15 PM	3/22/62 9:30 AM	20:15:00	LPRSA0189326	ABC013346				
4/1/62 5:45 AM	4/2/62 11:10 AM	29:25:00	LPRSA0189325	ABC013345				
4/7/62 3:05 PM	4/9/62 8:50 AM	41:45:00	LPRSA0189324	ABC013344				
4/9/62 3:55 PM	4/10/62 8:35 AM	16:40:00	LPRSA0189323	ABC013343				
6/5/62 10:15 PM	6/6/62 9:00 AM	10:45:00	LPRSA0189315	ABC013335				
6/13/62 2:25 PM	6/14/62 9:00 AM	18:35:00	LPRSA0189314	ABC013334				
6/26/62 5:15 PM	6/27/62 9:10 AM	15:55:00	LPRSA0189312	ABC013332				
7/18/62 2:40 PM	7/19/62 8:45 AM	18:05:00	LPRSA0189310	ABC013330				
8/7/62 2:30 PM	8/8/62 9:00 AM	18:30:00	LPRSA0189308	ABC013328				
8/9/62 7:45 PM	8/10/62 3:00 PM	19:15:00	LPRSA0189307	ABC013327				
8/10/62 10:40 PM	8/11/62 1:00 PM	14:20:00	LPRSA0189306	ABC013326				
8/17/62 6:10 PM	8/18/62 9:35 AM	15:25:00	LPRSA0189305	ABC013325				
8/21/62 11:20 AM	8/22/62 1:10 PM	25:50:00	LPRSA0189304	ABC013324				
8/28/62 5:25 AM	8/29/62 1:50 PM	32:25:00	LPRSA0189303	ABC013323				
9/5/62 11:35 AM	9/6/62 8:45 AM	21:10:00	LPRSA0189301	ABC013321				
9/17/62 6:10 PM	9/18/62 9:00 AM	14:50:00	LPRSA0189299	ABC013319				
9/27/62 9:30 AM	9/29/62 10:45 AM	49:15:00	LPRSA0189296	ABC013316				
10/5/62 4:45 AM	10/7/62 9:50 AM	53:05:00	LPRSA0189295	ABC013315				
10/23/62 11:35 AM	10/24/62 10:30 AM	22:55:00	LPRSA0189291	ABC013311				
10/25/62 11:00 PM	10/27/62 9:55 AM	34:55:00	LPRSA0189290	ABC013310				
10/30/62 2:15 PM	11/1/62 2:30 PM	48:15:00	LPRSA0189289	ABC013309				
11/3/62 10:25 AM	11/5/62 9:00 AM	46:35:00	LPRSA0189288	ABC013308				
11/9/62 3:00 PM	11/11/62 10:30 AM	43:30:00	LPRSA0189287	ABC013307				
11/13/62 3:20 PM	11/14/62 8:55 AM	17:35:00	LPRSA0189286	ABC013306				
11/18/62 1:30 PM	11/19/62 3:00 PM	25:30:00	LPRSA0189285	ABC013305				
11/21/62 10:40 PM	11/23/62 9:45 AM	35:05:00	LPRSA0189284	ABC013304				
12/5/62 9:00 AM	12/8/62 9:45 AM	72:45:00	LPRSA0189283	ABC013303				
12/22/62 12:05 PM	12/24/62 9:30 AM	45:25:00	LPRSA0189282	ABC013302				
12/29/62 8:35 PM	12/30/62 12:10 PM	15:35:00	LPRSA0189280	ABC013300				
* 1/1/63 12:00 AM 9/12/74 11:59 PM								

Subtotal

14096:36:00

* Missing data.

Source: PVSC throw-out logs.

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NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

**Exhibit 2-4e. Documented PVSC Bypasses at Clay Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1974-1975)

9/13/74	9/14/74	0:00:00	LPRSA0196840				
10/16/74 4:00 AM	10/17/74 9:00 PM	41:00:00	LPRSA0195712				
12/2/74 1:00 AM	12/2/74 8:00 AM	7:00:00	LPRSA0195714				
12/8/74 1:00 PM	12/9/74 8:00 AM	19:00:00	LPRSA0195714				
12/16/74 11:00 AM	12/17/74 8:00 AM	21:00:00	LPRSA0195714				
1/9/75 6:00 AM	1/9/75 1:00 PM	7:00:00	LPRSA0195715				
1/13/75 10:00 AM	1/14/75 9:00 AM	23:00:00	LPRSA0195715				
1/18/75	1/18/75	15:15:00	LPRSA0196840	60.0	38.13	253	80,555
1/18/75 3:00 PM	1/19/75 6:00 AM	0:00:00	LPRSA0195715				
1/29/75	1/29/75	9:37:48	LPRSA0196840	54.2	21.75	253	45,951
1/29/75 6:00 AM	1/29/75 4:00 PM	0:22:12	LPRSA0195715				
2/24/75	2/24/75	10:37:12	LPRSA0196840	34.1	15.09	253	31,882
2/24/75 5:00 AM	2/25/75 6:00 AM	14:22:48	LPRSA0195716				
3/12/75	3/12/75	5:00:00	LPRSA0196840	86.7	18.06	253	38,165
3/19/75 5:00 PM	3/20/75 1:00 PM	20:00:00	LPRSA0195717				
4/3/75	4/3/75	3:30:00	LPRSA0196840	96.5	14.07	253	29,735
4/3/75 9:00 AM	4/3/75 5:00 PM	4:30:00	LPRSA0195718				
4/24/75 4:00 AM	4/24/75 9:00 AM	5:00:00	LPRSA0195718				
4/24/75	4/25/75	6:55:12	LPRSA0196840	44.8	12.92	253	27,293
4/25/75 2:00 AM	4/25/75 9:00 AM	0:04:48	LPRSA0195718				
5/13/75	5/13/75	10:13:12	LPRSA0196841	59.1	25.17	253	53,175
5/13/75 11:00 PM	5/14/75 9:00 AM	0:00:00	LPRSA0195719				
6/1/75 7:00 AM	6/1/75 5:00 PM	10:00:00	LPRSA0195720				
6/5/75 8:00 PM	6/6/75 11:00 AM	15:00:00	LPRSA0195720				
6/6/75 3:00 PM	6/7/75 8:00 AM	17:00:00	LPRSA0195720				
6/12/75 10:00 AM	6/13/75 9:00 AM	23:00:00	LPRSA0195720				
7/4/75 4:00 AM	7/4/75 12:00 PM	8:00:00	LPRSA0195721				
7/7/75 8:00 AM	7/7/75 10:00 PM	14:00:00	LPRSA0195721				
7/9/75 6:00 PM	7/10/75 2:00 AM	8:00:00	LPRSA0195721				
7/13/75 12:00 PM	7/16/75 5:00 PM	77:00:00	LPRSA0195721				
7/25/75 2:00 AM	7/25/75 3:00 PM	13:00:00	LPRSA0195721				
* 10/1/75	12/31/04						
Subtotal		408:28:12			145.18		306,756
Estimated Mass/Bypass Time (lb/hr)							5,017
Estimated Bypassed Volume Rate (MG/hr)				2.375			

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

(2005-2014)

		Elapsed Time (hours)	Frequency of Overflows (#/yr)
1/1/2005	12/31/2005	458.78	35
1/1/2006	12/31/2006	640.37	36
1/1/2007	12/31/2007	463.07	35
1/1/2008	12/31/2008	601.26	47
1/1/2009	12/31/2009	518.99	52
1/1/2010	12/31/2010	410.43	36
1/1/2011	12/31/2011	638.14	62

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**Exhibit 2-4e. Documented PVSC Bypasses at Clay Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
1/1/2012	12/31/2012	163.31	35				
1/1/2013	12/31/2013	364.10	39				
1/1/2014	12/31/2014	364.10	39				
* 1/1/2015	9/30/2016						
Subtotal (2005-2014)		4622.55					
Average annual bypass time (hr)		462.26					

* Missing data.

Source: PVSC, NJPDES permit reports to NJDEP, CSO Regulator Events, 2008-2015.

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**Exhibit 2-4f. Documented PVSC Bypasses at Rector Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Volume (MG)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1950-1962)

*	8/2/24 12:00 PM	10/3/50 11:59 PM	LPRSA0198629					
	10/4/50 10:00 PM	10/5/50 11:30 AM	13:30:00 LPRSA0188654	ABC012674				
	10/10/50 2:30 AM	10/10/50 1:00 PM	10:30:00 LPRSA0188652	ABC012672				
	10/12/50 1:30 PM	10/13/50 11:00 AM	21:30:00 LPRSA0188650	ABC012670				
	10/23/50 1:30 PM	10/24/50 9:00 AM	19:30:00 LPRSA0188648	ABC012668				
	11/20/50 6:00 PM	11/21/50 9:00 AM	15:00:00 LPRSA0188646	ABC012666				
	11/25/50 9:00 AM	11/25/50 1:00 PM	4:00:00 LPRSA0188643	ABC012663				
	12/4/50 12:30 PM	12/5/50 9:30 AM	21:00:00 LPRSA0188641	ABC012661				
	12/7/50 4:00 PM	12/8/50 11:30 AM	19:30:00 LPRSA0188637	ABC012657				
	12/15/50 10:30 PM	12/16/50 2:30 PM	16:00:00 LPRSA0188639	ABC012659				
	12/29/50 12:30 PM	12/30/50 11:30 AM	23:00:00 LPRSA0188635	ABC012655				
	1/7/51 5:00 PM	1/8/51 9:00 AM	16:00:00 LPRSA0188633	ABC012653				
	1/11/51 5:30 PM	1/12/51 8:30 AM	15:00:00 LPRSA0188619	ABC012639				
	1/14/51 6:00 PM	1/15/51 12:00 PM	18:00:00 LPRSA0188631	ABC012651				
	1/23/51 2:00 AM	1/24/51 2:00 PM	36:00:00 LPRSA0188621	ABC012641				
	1/25/51 4:00 PM	1/26/51 10:00 AM	18:00:00 LPRSA0188623	ABC012643				
	1/28/51 5:00 PM	1/30/51 10:00 AM	41:00:00 LPRSA0188625	ABC012645				
	1/31/51 4:00 PM	2/2/51 10:00 AM	42:00:00 LPRSA0188628	ABC012648				
	2/10/51 5:30 AM	2/10/51 2:30 PM	9:00:00 LPRSA0188588	ABC012608				
	2/11/51 6:00 PM	2/15/51 2:30 PM	92:30:00 LPRSA0188588	ABC012608				
	2/17/51 4:00 AM	2/18/51 11:30 AM	31:30:00 LPRSA0188588	ABC012608				
	2/19/51 5:00 PM	2/20/51 2:30 PM	21:30:00 LPRSA0188596	ABC012616				
	2/23/51 8:30 AM	2/23/51 10:00 AM	1:30:00 LPRSA0188596	ABC012616				
	3/1/51 1:00 PM	3/2/51 10:00 AM	21:00:00 LPRSA0188604	ABC012624				
	3/3/51 3:00 PM	3/5/51 10:30 AM	43:30:00 LPRSA0188606	ABC012626				
	3/13/51 4:30 PM	3/15/51 9:30 AM	41:00:00 LPRSA0188609	ABC012629				
	3/16/51 4:00 PM	3/19/51 9:30 AM	65:30:00 LPRSA0188612	ABC012632				
	3/19/51 5:00 PM	3/21/51 9:00 AM	40:00:00 LPRSA0188616	ABC012636				
*	3/22/51 12:00 AM	12/31/51 11:59 PM						
	2/17/52 3:30 AM	2/19/52 11:00 AM	55:30:00 LPRSA0189755	ABC013775				
	2/20/52 6:00 PM	2/22/52 10:30 AM	40:30:00 LPRSA0189754	ABC013774				
	2/29/52 9:00 PM	3/7/52 10:30 AM	157:30:00 LPRSA0189753	ABC013773				
	3/11/52 5:00 AM	3/18/52 10:30 AM	173:30:00 LPRSA0189752	ABC013772				
	3/19/52 10:30 AM	3/21/52 11:00 AM	48:30:00 LPRSA0189751	ABC013771				
	3/22/52 5:00 PM	3/26/52 11:00 AM	90:00:00 LPRSA0189750	ABC013770				
	4/5/52 8:00 AM	4/7/52 11:00 AM	51:00:00 LPRSA0189749	ABC013769				
	4/14/52 4:00 AM	4/17/52 11:00 AM	79:00:00 LPRSA0189748	ABC013768				
	4/25/52 11:00 AM	5/9/52 4:30 PM	341:30:00 LPRSA0189744	ABC013764				
	5/11/52 10:00 PM	5/14/52 2:30 PM	64:30:00 LPRSA0189743	ABC013763				
	5/18/52 8:15 AM	5/23/52 3:00 PM	126:45:00 LPRSA0189741	ABC013761				
	5/25/52 9:45 AM	5/27/52 1:00 PM	51:15:00 LPRSA0189740	ABC013760				
	5/29/52 3:45 PM	6/14/52 10:00 AM	378:15:00 LPRSA0189736	ABC013756				
	6/17/52 5:40 PM	6/18/52 1:30 PM	19:50:00 LPRSA0189735	ABC013755				
	6/19/52 3:00 PM	6/20/52 9:30 AM	18:30:00 LPRSA0189734	ABC013754				
	6/27/52 4:20 PM	6/28/52 9:00 AM	16:40:00 LPRSA0189729	ABC013749				
	6/29/52 1:30 AM	6/30/52 10:15 AM	32:45:00 LPRSA0189728	ABC013748				
	7/8/52 4:30 PM	7/10/52 4:45 PM	48:15:00 LPRSA0189730	ABC013750				
	7/21/52 4:45 PM	7/22/52 10:45 AM	18:00:00 LPRSA0189725	ABC013745				
	7/31/52 5:15 PM	8/1/52 10:15 AM	17:00:00 LPRSA0189724	ABC013744				
	8/2/52 4:30 PM	8/3/52 9:45 AM	17:15:00 LPRSA0189725	ABC013745				
	8/6/52 3:30 PM	8/11/52 9:30 AM	114:00:00 LPRSA0189715	ABC013735				

ADR CONFIDENTIAL

NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

**Exhibit 2-4f. Documented PVSC Bypasses at Rector Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Volume (MG)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
8/12/52 5:30 PM	8/14/52 9:15 AM	39:45:00	LPRSA0189721 ABC013741					
8/15/52 5:15 PM	8/17/52 9:15 AM	40:00:00	LPRSA0189714 ABC013734					
8/21/52 4:45 PM	8/22/52 1:00 PM	20:15:00	LPRSA0189713 ABC013733					
8/30/52 10:15 AM	9/2/52 9:15 AM	71:00:00	LPRSA0189712 ABC013732					
9/2/52 5:15 PM	9/4/52 9:00 AM	39:45:00	LPRSA0189711 ABC013731					
9/15/52 4:30 PM	9/17/52 5:15 PM	48:45:00	LPRSA0189709 ABC013729					
9/18/52 1:15 PM	9/20/52 9:15 AM	44:00:00	LPRSA0189710 ABC013730					
9/23/52 10:45 AM	9/24/52 9:30 AM	22:45:00	LPRSA0189708 ABC013728					
10/2/52 7:15 PM	10/3/52 1:45 PM	18:30:00	LPRSA0189707 ABC013727					
10/28/52 5:45 PM	10/29/52 9:15 AM	15:30:00	LPRSA0189706 ABC013726					
11/2/52 9:30 AM	11/2/52 2:30 PM	5:00:00	LPRSA0189705 ABC013725					
11/3/52 2:15 PM	11/4/52 9:15 AM	19:00:00	LPRSA0189703 ABC013723					
11/10/52 4:45 PM	11/11/52 9:15 AM	16:30:00	LPRSA0189704 ABC013724					
11/14/52 1:45 PM	12/1/52 1:45 PM	408:00:00	LPRSA0189701 ABC013721					
12/2/52 2:15 PM	12/8/52 9:00 AM	138:45:00	LPRSA0189702 ABC013722					
12/9/52 8:15 AM	1/18/53 2:45 PM	966:30:00	LPRSA0189655 ABC013675					
1/21/53 3:15 PM	1/22/53 1:00 PM	21:45:00	LPRSA0189656 ABC013676					
1/24/53 10:15 AM	1/25/53 10:00 AM	23:45:00	LPRSA0189657 ABC013677					
2/11/53 5:30 PM	2/13/53 10:30 AM	41:00:00	LPRSA0189658 ABC013678					
2/15/53 11:15 AM	2/16/53 2:00 PM	26:45:00	LPRSA0189659 ABC013679					
2/25/53 9:15 AM	3/11/53 9:30 AM	336:15:00	LPRSA0189661 ABC013681					
3/13/53 3:45 PM	3/14/53 12:15 PM	20:30:00	LPRSA0189668 ABC013688					
3/17/53 2:45 PM	4/29/53 10:30 AM	1027:45:00	LPRSA0189668 ABC013688					
* 4/30/53 5:15 PM			LPRSA0189668 ABC013688					
6/13/53 5:30 PM	6/15/53 10:45 AM	41:15:00	LPRSA0189674 ABC013694					
6/22/53 10:30 AM	7/2/53 2:30 PM	244:00:00	LPRSA0189677 ABC013697					
7/6/53 8:30 PM	7/7/53 9:00 AM	12:30:00	LPRSA0189681 ABC013701					
7/20/53 9:45 PM	7/21/53 9:20 AM	11:35:00	LPRSA0189682 ABC013702					
7/21/53 4:15 PM	7/22/53 8:45 AM	16:30:00	LPRSA0189683 ABC013703					
7/23/53 9:05 AM	7/24/53 1:00 PM	27:55:00	LPRSA0189684 ABC013704					
8/10/53 1:30 AM	8/10/53 11:00 AM	9:30:00	LPRSA0189685 ABC013705					
8/14/53 1:45 PM	8/15/53 9:00 AM	19:15:00	LPRSA0189686 ABC013706					
10/6/53 6:45 PM	10/7/53 10:00 AM	15:15:00	LPRSA0189689 ABC013709					
10/20/53 8:45 AM	10/29/53 5:00 PM	224:15:00	LPRSA0189690 ABC013710					
11/7/53 7:45 AM	11/8/53 11:15 AM	27:30:00	LPRSA0189695 ABC013715					
* 11/16/53 10:15 AM			LPRSA0189653 ABC013673					
11/23/53 10:30 AM	11/23/53 3:45 PM	5:15:00	LPRSA0189698 ABC013718					
11/25/53 12:45 PM	11/26/53 9:30 AM	20:45:00	LPRSA0189652 ABC013672					
11/30/53 10:30 AM	12/5/53 8:15 AM	117:45:00	LPRSA0189651 ABC013671					
12/6/53 10:00 AM	12/8/53 9:30 AM	47:30:00	LPRSA0189650 ABC013670					
12/9/53 5:00 PM	12/11/53 9:30 AM	40:30:00	LPRSA0189649 ABC013669					
12/14/53 6:45 AM	12/15/53 1:15 PM	30:30:00	LPRSA0189647 ABC013667					
1/15/54 1:45 PM	1/18/54 10:30 AM	68:45:00	LPRSA0189592 ABC013612					
1/20/54 2:30 PM	1/22/54 1:00 PM	46:30:00	LPRSA0189591 ABC013611					
1/25/54 3:30 AM	2/2/54 1:30 PM	202:00:00	LPRSA0189590 ABC013610					
2/3/54 2:00 PM	2/4/54 10:00 AM	20:00:00	LPRSA0189589 ABC013609					
2/15/54 2:30 PM	2/19/54 1:45 PM	95:15:00	LPRSA0189587 ABC013607					
2/21/54 5:45 PM	2/22/54 9:15 AM	15:30:00	LPRSA0189586 ABC013606					
2/23/54 12:30 PM	2/27/54 9:15 AM	92:45:00	LPRSA0189621 ABC013641					
3/1/54 11:30 AM	3/5/54 2:15 PM	98:45:00	LPRSA0189619 ABC013639					
3/13/54 3:30 PM	3/15/54 10:00 AM	42:30:00	LPRSA0189618 ABC013638					
3/19/54 5:00 PM	3/20/54 2:15 PM	21:15:00	LPRSA0189617 ABC013637					
3/25/54 10:30 AM	3/26/54 10:15 AM	23:45:00	LPRSA0189616 ABC013636					

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**Exhibit 2-4f. Documented PVSC Bypasses at Rector Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Volume (MG)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
4/8/54 2:15 PM	4/9/54 10:00 AM	19:45:00	LPRSA0189613 ABC013633					
4/13/54 1:00 PM	4/13/54 3:20 PM	2:20:00	LPRSA0189623 ABC013643					
4/16/54 1:30 PM	4/18/54 10:30 AM	45:00:00	LPRSA0189632 ABC013652					
4/19/54 4:15 PM	4/21/54 4:00 PM	47:45:00	LPRSA0189615 ABC013635					
4/23/54 2:00 PM	4/25/54 10:00 AM	44:00:00	LPRSA0189614 ABC013634					
4/28/54 3:45 PM	4/29/54 10:00 AM	18:15:00	LPRSA0189612 ABC013632					
5/3/54 11:15 AM	5/26/54 9:30 AM	550:15:00	LPRSA0189631 ABC013651					
6/1/54 12:15 PM	6/9/54 10:30 AM	190:15:00	LPRSA0189630 ABC013650					
6/10/54 3:00 PM	6/11/54 9:45 AM	18:45:00	LPRSA0189629 ABC013649					
7/2/54 9:30 AM	7/2/54 11:15 AM	1:45:00	LPRSA0189627 ABC013647					
7/2/54 2:00 PM	7/2/54 4:30 PM	2:30:00	LPRSA0189626 ABC013646					
7/4/54 12:45 PM	7/6/54 9:45 AM	45:00:00	LPRSA0189625 ABC013645					
7/7/54 5:15 PM	7/8/54 1:30 PM	20:15:00	LPRSA0189624 ABC013644					
7/14/54 5:00 PM	7/15/54 12:30 PM	19:30:00	LPRSA0189634 ABC013654					
7/22/54 4:00 PM	7/23/54 9:30 AM	17:30:00	LPRSA0189633 ABC013653					
8/3/54 10:00 AM	8/4/54 10:00 AM	24:00:00	LPRSA0189620 ABC013640					
8/9/54 9:45 AM	8/11/54 10:15 AM	48:30:00	LPRSA0189622 ABC013642					
8/19/54 11:30 PM	8/20/54 10:45 AM	11:15:00	LPRSA0189611 ABC013631					
8/20/54 7:15 PM	8/22/54 9:15 AM	38:00:00	LPRSA0189610 ABC013630					
8/25/54 5:30 PM	8/26/54 1:30 PM	20:00:00	LPRSA0189609 ABC013629					
9/8/54 3:15 PM	9/9/54 1:30 PM	22:15:00	LPRSA0189607 ABC013627					
9/10/54 2:15 PM	9/12/54 10:00 AM	43:45:00	LPRSA0189606 ABC013626					
10/7/54 9:45 AM	10/8/54 2:00 PM	28:15:00	LPRSA0189604 ABC013624					
10/15/54 12:00 PM	10/16/54 7:30 AM	19:30:00	LPRSA0189603 ABC013623					
10/27/54 5:15 PM	10/28/54 1:30 AM	8:15:00	LPRSA0189602 ABC013622					
10/29/54 10:15 AM	10/30/54 9:45 AM	23:30:00	LPRSA0189601 ABC013621					
11/2/54 1:45 PM	11/5/54 3:00 PM	73:15:00	LPRSA0189600 ABC013620					
11/8/54 2:00 PM	11/9/54 2:00 PM	24:00:00	LPRSA0189599 ABC013619					
11/15/54 10:30 AM	12/2/54 3:15 AM	400:45:00	LPRSA0189597 ABC013617					
12/9/54 2:45 PM	12/10/54 2:00 PM	23:15:00	LPRSA0189596 ABC013616					
12/14/54 10:15 AM	12/15/54 1:45 PM	27:30:00	LPRSA0189595 ABC013615					
12/18/54 11:00 AM	12/19/54 9:00 AM	22:00:00	LPRSA0189593 ABC013613					
12/29/54 1:45 PM	12/30/54 2:00 PM	24:15:00	LPRSA0189585 ABC013605					
1/6/55 2:45 PM	1/7/55 10:00 AM	19:15:00	LPRSA0189582 ABC013602					
1/28/55 10:30 AM	3/9/55 10:30 AM	960:00:00	LPRSA0189580 ABC013600					
4/6/55 3:00 PM	4/7/55 9:15 AM	18:15:00	LPRSA0189575 ABC013595					
4/12/55 3:15 PM	4/15/55 9:45 AM	66:30:00	LPRSA0189574 ABC013594					
5/31/55 2:15 PM	5/31/55 4:30 PM	2:15:00	LPRSA0189572 ABC013592					
6/22/55 12:00 AM	6/22/55 9:15 AM	9:15:00	LPRSA0189571 ABC013591					
8/8/55 2:00 AM	8/8/55 9:00 AM	7:00:00	LPRSA0189570 ABC013590					
8/19/55 12:15 AM	8/20/55 10:00 AM	33:45:00	LPRSA0189567 ABC013587					
8/22/55 10:45 PM	8/24/55 1:30 PM	38:45:00	LPRSA0189566 ABC013586					
9/24/55 7:30 AM	9/26/55 9:15 AM	49:45:00	LPRSA0189563 ABC013583					
10/6/55 9:15 AM	10/7/55 2:00 PM	28:45:00	LPRSA0189562 ABC013582					
10/14/55 10:15 AM	10/25/55 1:45 PM	267:30:00	LPRSA0189561 ABC013581					
10/30/55 10:45 AM	11/1/55 2:15 PM	51:30:00	LPRSA0189560 ABC013580					
11/10/55 4:45 PM	11/12/55 9:30 AM	40:45:00	LPRSA0189559 ABC013579					
11/16/55 10:15 AM	11/18/55 10:30 AM	48:15:00	LPRSA0189558 ABC013578					
1/30/56 2:15 PM	1/31/56 9:15 AM	19:00:00	LPRSA0189556 ABC013576					
2/2/56 12:45 PM	2/3/56 9:15 AM	20:30:00	LPRSA0189555 ABC013575					
2/6/56 4:45 PM	2/7/56 1:30 PM	20:45:00	LPRSA0189554 ABC013574					
2/18/56 9:30 AM	2/19/56 9:00 AM	23:30:00	LPRSA0189553 ABC013573					
3/8/56 2:45 AM	3/9/56 9:30 AM	30:45:00	LPRSA0189552 ABC013572					

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**Exhibit 2-4f. Documented PVSC Bypasses at Rector Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Volume (MG)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
3/14/56 9:45 AM	3/15/56 9:30 AM	23:45:00	LPRSA0189551 ABC013571					
3/21/56 6:30 PM	3/23/56 9:45 AM	39:15:00	LPRSA0189549 ABC013569					
4/11/56 4:35 PM	4/12/56 10:05 AM	17:30:00	LPRSA0189545 ABC013565					
5/2/56 10:45 PM	5/3/56 10:30 AM	11:45:00	LPRSA0189544 ABC013564					
6/2/56 4:30 PM	6/4/56 11:15 AM	42:45:00	LPRSA0189543 ABC013563					
6/27/56 4:20 PM	6/27/56 7:30 PM	3:10:00	LPRSA0189542 ABC013562					
7/16/56 3:45 PM	7/17/56 10:15 AM	18:30:00	LPRSA0189541 ABC013561					
7/21/56 11:00 AM	7/21/56 11:05 PM	12:05:00	LPRSA0189540 ABC013560					
7/27/56 10:45 AM	7/28/56 9:20 AM	22:35:00	LPRSA0189539 ABC013559					
8/6/56 5:45 PM	8/7/56 9:30 AM	15:45:00	LPRSA0189538 ABC013558					
8/21/56 5:00 AM	8/22/56 9:15 AM	28:15:00	LPRSA0189537 ABC013557					
9/6/56 7:15 PM	9/7/56 9:00 AM	13:45:00	LPRSA0189536 ABC013556					
9/7/56 11:00 AM	9/8/56 12:15 PM	25:15:00	LPRSA0189535 ABC013555					
9/27/56 5:15 PM	9/28/56 9:30 AM	16:15:00	LPRSA0189534 ABC013554					
10/22/56 10:45 PM	10/23/56 9:15 AM	10:30:00	LPRSA0189533 ABC013553					
10/31/56 1:00 PM	11/4/56 12:15 PM	95:15:00	LPRSA0189532 ABC013552					
11/18/56 3:30 AM	11/18/56 12:15 PM	8:45:00	LPRSA0189531 ABC013551					
11/22/56 1:45 AM	11/22/56 9:15 AM	7:30:00	LPRSA0189530 ABC013550					
12/9/56 4:15 PM	12/10/56 9:45 AM	17:30:00	LPRSA0189529 ABC013549					
12/14/56 9:30 AM	12/17/56 9:00 AM	71:30:00	LPRSA0189528 ABC013548					
12/22/56 11:20 PM	12/23/56 11:15 AM	11:55:00	LPRSA0189527 ABC013547					
1/23/57 5:00 AM	1/23/57 3:15 PM	10:15:00	LPRSA0189498 ABC013518					
2/9/57 3:15 PM	2/10/57 10:00 AM	18:45:00	LPRSA0189497 ABC013517					
2/26/57 5:00 PM	2/27/57 2:00 PM	21:00:00	LPRSA0189496 ABC013516					
3/1/57 5:45 PM	3/2/57 11:45 PM	30:00:00	LPRSA0189524 ABC013544					
3/8/57 11:15 AM	3/10/57 11:00 AM	47:45:00	LPRSA0189523 ABC013543					
3/19/57 11:15 PM	3/21/57 10:30 AM	35:15:00	LPRSA0189521 ABC013541					
4/2/57 9:30 AM	4/2/57 3:15 PM	5:45:00	LPRSA0189520 ABC013540					
4/9/57 10:30 AM	4/9/57 5:15 PM	6:45:00	LPRSA0189516 ABC013536					
4/10/57 10:30 AM	4/10/57 5:15 PM	6:45:00	LPRSA0189515 ABC013535					
4/11/57 9:45 AM	4/11/57 5:15 PM	7:30:00	LPRSA0189514 ABC013534					
4/12/57 9:45 AM	4/12/57 5:30 PM	7:45:00	LPRSA0189513 ABC013533					
4/23/57 8:15 AM	4/23/57 3:15 PM	7:00:00	LPRSA0189511 ABC013531					
5/14/57 10:15 PM	5/15/57 12:00 PM	13:45:00	LPRSA0189508 ABC013528					
* 5/16/57 12:00 AM	8/25/57 11:59 PM							
* 9/18/57 12:00 AM	12/19/57 11:59 PM							
5/7/58 12:45 PM	5/8/58 8:15 AM	19:30:00	LPRSA0189478 ABC013498					
10/22/58 10:30 PM	10/24/58 9:30 AM	35:00:00	LPRSA0189469 ABC013489					
10/25/58 6:15 PM	10/27/58 2:15 PM	44:00:00	LPRSA0189468 ABC013488					
11/28/58 10:00 PM	11/29/58 12:00 PM	14:00:00	LPRSA0189466 ABC013486					
3/6/59 9:00 AM	3/7/59 10:15 AM	25:15:00	LPRSA0189458 ABC013478					
6/2/59 7:45 PM	6/3/59 9:30 AM	13:45:00	LPRSA0189454 ABC013474					
8/5/59 12:00 PM	8/5/59 3:45 PM	3:45:00	LPRSA0189448 ABC013468					
8/9/59 5:45 AM	8/9/59 6:50 AM	1:05:00	LPRSA0189447 ABC013467					
9/1/59 6:45 PM	9/2/59 1:30 PM	18:45:00	LPRSA0189445 ABC013465					
12/7/59 1:30 AM	12/7/59 9:00 AM	7:30:00	LPRSA0189431 ABC013451					
2/26/60 1:30 AM	2/26/60 10:00 AM	8:30:00	LPRSA0189420 ABC013440					
4/3/60 10:20 PM	4/4/60 8:50 AM	10:30:00	LPRSA0189416 ABC013436					
7/30/60 10:20 AM	7/31/60 9:30 AM	23:10:00	LPRSA0189402 ABC013422					
8/19/60 9:10 AM	8/20/60 9:45 AM	24:35:00	LPRSA0189399 ABC013419					
9/12/60 8:20 AM	9/13/60 10:20 AM	26:00:00	LPRSA0189397 ABC013417					

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**Exhibit 2-4f. Documented PVSC Bypasses at Rector Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Volume (MG)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
9/19/60 11:10 AM	9/20/60 2:00 PM	26:50:00	LPRSA0189396 ABC013416					
12/12/60 1:00 PM	12/14/60 1:00 PM	48:00:00	LPRSA0189392 ABC013412					
12/21/60 9:40 AM	12/22/60 11:15 AM	25:35:00	LPRSA0189391 ABC013411					
3/14/61 8:45 AM	3/14/61 2:30 PM	5:45:00	LPRSA0189382 ABC013402					
3/23/61 3:10 PM	3/24/61 10:50 AM	19:40:00	LPRSA0189383 ABC013403					
4/10/61 11:20 AM	4/11/61 8:30 AM	21:10:00	LPRSA0189376 ABC013396					
4/13/61 9:40 AM	4/14/61 8:30 AM	22:50:00	LPRSA0189375 ABC013395					
4/16/61 1:15 PM	4/17/61 9:00 AM	19:45:00	LPRSA0189373 ABC013393					
4/25/61 8:40 PM	4/26/61 8:20 AM	11:40:00	LPRSA0189369 ABC013389					
7/20/61 12:40 PM	7/21/61 9:25 AM	20:45:00	LPRSA0189357 ABC013377					
9/20/61 2:20 PM	9/22/61 10:35 AM	44:15:00	LPRSA0189348 ABC013368					
12/18/61 12:25 PM	12/21/61 8:15 AM	67:50:00	LPRSA0189338 ABC013358					
2/26/62 1:15 PM	2/27/62 8:40 AM	19:25:00	LPRSA0189329 ABC013349					
2/27/62 1:50 PM	3/1/62 8:45 AM	42:55:00	LPRSA0189329 ABC013349					
3/12/62 8:30 AM	3/13/62 3:00 PM	30:30:00	LPRSA0189327 ABC013347					
9/5/62 1:15 PM	9/6/62 1:10 PM	23:55:00	LPRSA0189301 ABC013321					
9/17/62 7:45 PM	9/18/62 1:20 PM	17:35:00	LPRSA0189299 ABC013319					
9/27/62 12:20 PM	9/28/62 1:50 PM	25:30:00	LPRSA0189296 ABC013316					
10/5/62 7:50 AM	10/6/62 9:35 AM	25:45:00	LPRSA0189295 ABC013315					
11/3/62 10:40 AM	11/5/62 9:35 AM	46:55:00	LPRSA0189288 ABC013308					
11/9/62 3:15 PM	11/11/62 10:45 AM	43:30:00	LPRSA0189287 ABC013307					
11/18/62 1:45 PM	11/19/62 8:35 AM	18:50:00	LPRSA0189285 ABC013305					
11/21/62 10:50 PM	11/23/62 9:55 AM	35:05:00	LPRSA0189284 ABC013304					
12/5/62 10:00 AM	12/8/62 10:00 AM	72:00:00	LPRSA0189283 ABC013303					
12/22/62 12:25 PM	12/24/62 9:50 AM	45:25:00	LPRSA0189282 ABC013302					
* 1/1/63 12:00 AM	9/30/74 11:59 PM							

Subtotal

13196:35:00

* Missing data.

Source: PVSC throw-out logs.

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**Exhibit 2-4f. Documented PVSC Bypasses at Rector Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Volume (MG)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
(1974-1975)								
10/16/74 9:00 AM	10/17/74 9:00 PM	36:00:00	LPRSA0195712					
12/2/74 5:00 AM	12/3/74 9:00 AM	28:00:00	LPRSA0195714					
12/8/74 1:00 PM	12/9/74 8:00 AM	19:00:00	LPRSA0195714					
12/16/74 12:00 PM	12/17/74 9:00 AM	21:00:00	LPRSA0195714					
1/25/75	1/25/75	0:00:00	LPRSA0196980					
1/29/75	1/29/75	5:30:00	LPRSA0196980	19.9	4.60	4.56	163	6,204
1/29/75 7:00 AM	1/29/75 12:00 PM	0:00:00	LPRSA0195715					
3/19/75 6:00 PM	3/20/75 9:00 AM	15:00:00	LPRSA0195717					
4/3/75 9:00 AM	4/3/75 11:00 PM	14:00:00	LPRSA0195718					
6/6/75	6/6/75	7:22:48	LPRSA0196980	1.9	0.60	0.58	163	795
6/6/75 1:00 AM	6/6/75 9:00 AM	0:37:12	LPRSA0195720					
6/6/75 5:00 PM	6/7/75 1:00 AM	8:00:00	LPRSA0195720					
6/12/75 11:00 AM	6/13/75 2:00 PM	27:00:00	LPRSA0195720					
7/4/75 5:00 AM	7/4/75 12:00 PM	7:00:00	LPRSA0195721					
7/7/75 9:00 AM	7/7/75 10:00 PM	13:00:00	LPRSA0195721					
7/9/75 7:00 PM	7/10/75 3:00 AM	8:00:00	LPRSA0195721					
7/13/75	7/14/75	20:49:48	LPRSA0196980	7.9	6.90	6.86	163	9,327
7/13/75 2:00 PM	7/14/75 10:00 AM	0:00:00	LPRSA0195721					
7/14/75 12:00 PM	7/17/75 9:00 AM	69:00:00	LPRSA0195721					
7/25/75 2:00 AM	7/25/75 2:00 PM	12:00:00	LPRSA0195721					
8/6/75	8/7/75	0:00:00	LPRSA0196980					
9/23/75 12:00 AM	9/28/75 10:00 AM	130:00:00	LPRSA0195722					
* 10/1/75	12/31/04							
Subtotal		441:19:48				12.00		16,325
Estimated Mass/Bypass Time (lb/hr)								484
Estimated Bypassed Volume Rate (MG/hr)				0.356				

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

(2005-2014)

		Elapsed Time (hours)	Frequency of Overflows (#/yr)
1/1/2005	12/31/2005	427.81	35
1/1/2006	12/31/2006	655.57	48
1/1/2007	12/31/2007	429.47	35
1/1/2008	12/31/2008	597.21	46
1/1/2009	12/31/2009	473.08	50
1/1/2010	12/31/2010	434.18	37
1/1/2011	12/31/2011	661.67	62
1/1/2012	12/31/2012	176.78	39
1/1/2013	12/31/2013	361.37	39
1/1/2014	12/31/2014	361.37	39
* 1/1/2015	9/30/2016		
Subtotal (2005-2014)		4578.51	
Average annual bypass time (hr)		457.85	

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**Exhibit 2-4f. Documented PVSC Bypasses at Rector Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Volume (MG)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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* Missing data.

Source: PVSC, NJPDES permit reports to NJDEP, CSO Regulator Events, 2008-2015.

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**Exhibit 2-4g. Documented PVSC Bypasses at Saybrook Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1950-1962)

*	8/2/24 12:00 PM	10/3/50 11:59 PM	LPRSA0198629				
	10/4/50 10:00 PM	10/5/50 11:30 AM	13:30:00 LPRSA0188654	ABC012674			
	10/10/50 2:30 AM	10/10/50 1:00 PM	10:30:00 LPRSA0188652	ABC012672			
	10/12/50 1:30 PM	10/13/50 11:00 AM	21:30:00 LPRSA0188650	ABC012670			
	10/23/50 1:30 PM	10/24/50 9:00 AM	19:30:00 LPRSA0188648	ABC012668			
	11/20/50 6:00 PM	11/21/50 9:00 AM	15:00:00 LPRSA0188646	ABC012666			
	11/25/50 9:00 AM	11/25/50 1:00 PM	4:00:00 LPRSA0188643	ABC012663			
	12/4/50 12:30 PM	12/5/50 9:30 AM	21:00:00 LPRSA0188641	ABC012661			
	12/7/50 4:00 PM	12/8/50 11:30 AM	19:30:00 LPRSA0188637	ABC012657			
	12/15/50 10:30 PM	12/16/50 2:30 PM	16:00:00 LPRSA0188639	ABC012659			
	12/29/50 12:30 PM	12/30/50 11:30 AM	23:00:00 LPRSA0188639	ABC012659			
	1/7/51 5:00 PM	1/8/51 9:00 AM	16:00:00 LPRSA0188633	ABC012653			
	1/11/51 5:30 PM	1/12/51 8:30 AM	15:00:00 LPRSA0188619	ABC012639			
	1/14/51 6:00 PM	1/15/51 12:00 PM	18:00:00 LPRSA0188631	ABC012651			
	1/23/51 2:00 AM	1/24/51 2:00 PM	36:00:00 LPRSA0188621	ABC012641			
*	1/25/51 4:00 PM	1/26/51 10:00 AM	18:00:00 LPRSA0188623	ABC012643			
	1/28/51 5:00 PM	1/30/51 10:00 AM	41:00:00 LPRSA0188625	ABC012645			
	1/31/51 4:00 PM	2/2/51 10:00 AM	42:00:00 LPRSA0188628	ABC012648			
	2/10/51 5:30 AM	2/10/51 2:30 PM	9:00:00 LPRSA0188588	ABC012608			
	2/11/51 6:00 PM	2/15/51 2:30 PM	92:30:00 LPRSA0188588	ABC012608			
	2/17/51 4:00 AM	2/18/51 11:30 AM	31:30:00 LPRSA0188588	ABC012608			
	2/19/51 5:00 PM	2/20/51 2:30 PM	21:30:00 LPRSA0188596	ABC012616			
	2/23/51 8:30 AM	2/23/51 10:00 AM	1:30:00 LPRSA0188596	ABC012616			
	3/1/51 1:00 PM	3/2/51 10:00 AM	21:00:00 LPRSA0188604	ABC012624			
	3/3/51 3:00 PM	3/5/51 10:30 AM	43:30:00 LPRSA0188606	ABC012626			
	3/13/51 4:30 PM	3/15/51 9:30 AM	41:00:00 LPRSA0188609	ABC012629			
	3/16/51 4:00 PM	3/19/51 9:30 AM	65:30:00 LPRSA0188612	ABC012632			
	3/19/51 5:00 PM	3/21/51 9:00 AM	40:00:00 LPRSA0188616	ABC012636			
	3/22/51 12:00 AM	12/31/51 11:59 PM					
	2/17/52 3:30 AM	2/19/52 11:00 AM	55:30:00 LPRSA0189755	ABC013775			
	2/20/52 6:00 PM	2/22/52 10:30 AM	40:30:00 LPRSA0189754	ABC013774			
	2/29/52 9:00 PM	3/7/52 10:30 AM	157:30:00 LPRSA0189753	ABC013773			
	3/11/52 5:00 AM	3/18/52 10:30 AM	173:30:00 LPRSA0189752	ABC013772			
	3/19/52 10:30 AM	3/21/52 11:00 AM	48:30:00 LPRSA0189751	ABC013771			
	3/22/52 5:00 PM	3/26/52 11:00 AM	90:00:00 LPRSA0189750	ABC013770			
	4/5/52 8:00 AM	4/7/52 11:00 AM	51:00:00 LPRSA0189749	ABC013769			
	4/14/52 4:00 AM	4/17/52 11:00 AM	79:00:00 LPRSA0189748	ABC013768			
	4/25/52 11:00 AM	5/9/52 4:30 PM	341:30:00 LPRSA0189744	ABC013764			
	5/11/52 10:00 PM	5/14/52 2:30 PM	64:30:00 LPRSA0189743	ABC013763			
	5/18/52 8:30 AM	5/23/52 3:15 PM	126:45:00 LPRSA0189741	ABC013761			
	5/25/52 10:00 AM	5/27/52 1:15 PM	51:15:00 LPRSA0189740	ABC013760			
	5/29/52 4:00 PM	6/14/52 10:15 AM	378:15:00 LPRSA0189736	ABC013756			
	6/17/52 6:00 PM	6/18/52 2:00 PM	20:00:00 LPRSA0189735	ABC013755			
	6/19/52 2:30 PM	6/20/52 9:15 AM	18:45:00 LPRSA0189734	ABC013754			
	6/27/52 4:30 PM	6/28/52 9:15 AM	16:45:00 LPRSA0189729	ABC013749			
	6/29/52 1:45 AM	6/30/52 10:45 AM	33:00:00 LPRSA0189728	ABC013748			
	7/8/52 4:45 PM	7/10/52 4:30 PM	47:45:00 LPRSA0189730	ABC013750			
	7/21/52 5:00 PM	7/22/52 1:00 PM	20:00:00 LPRSA0189725	ABC013745			
	7/31/52 5:20 PM	8/1/52 10:20 AM	17:00:00 LPRSA0189724	ABC013744			
	8/2/52 4:45 PM	8/3/52 10:00 AM	17:15:00 LPRSA0189725	ABC013745			
	8/6/52 3:45 PM	8/11/52 9:45 AM	114:00:00 LPRSA0189715	ABC013735			

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**Exhibit 2-4g. Documented PVSC Bypasses at Saybrook Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
8/12/52 5:45 PM	8/14/52 9:30 AM	39:45:00	LPRSA0189721	ABC013741				
8/15/52 5:30 PM	8/17/52 9:30 AM	40:00:00	LPRSA0189714	ABC013734				
8/21/52 5:00 PM	8/22/52 1:15 PM	20:15:00	LPRSA0189713	ABC013733				
8/30/52 10:30 AM	9/2/52 9:30 AM	71:00:00	LPRSA0189712	ABC013732				
9/2/52 5:30 PM	9/4/52 9:15 AM	39:45:00	LPRSA0189711	ABC013731				
9/15/52 5:00 PM	9/17/52 5:30 PM	48:30:00	LPRSA0189709	ABC013729				
9/18/52 1:30 PM	9/20/52 9:30 AM	44:00:00	LPRSA0189710	ABC013730				
9/23/52 11:00 AM	9/24/52 9:45 AM	22:45:00	LPRSA0189708	ABC013728				
10/2/52 7:30 PM	10/3/52 2:00 PM	18:30:00	LPRSA0189707	ABC013727				
10/28/52 6:00 PM	10/29/52 9:30 AM	15:30:00	LPRSA0189706	ABC013726				
11/2/52 9:45 AM	11/2/52 2:45 PM	5:00:00	LPRSA0189705	ABC013725				
11/3/52 2:30 PM	11/4/52 9:30 AM	19:00:00	LPRSA0189703	ABC013723				
11/10/52 5:00 PM	11/11/52 9:30 AM	16:30:00	LPRSA0189704	ABC013724				
11/14/52 2:00 PM	12/1/52 2:00 PM	408:00:00	LPRSA0189701	ABC013721				
12/2/52 2:30 PM	12/8/52 9:15 AM	138:45:00	LPRSA0189702	ABC013722				
12/9/52 8:30 AM	1/18/53 3:00 PM	966:30:00	LPRSA0189655	ABC013675				
1/21/53 3:30 PM	1/22/53 1:15 PM	21:45:00	LPRSA0189656	ABC013676				
1/24/53 10:30 AM	1/25/53 10:15 AM	23:45:00	LPRSA0189657	ABC013677				
2/11/53 5:45 PM	2/13/53 10:45 AM	41:00:00	LPRSA0189658	ABC013678				
2/15/53 11:30 AM	2/16/53 2:15 PM	26:45:00	LPRSA0189659	ABC013679				
2/25/53 9:30 AM	3/11/53 9:45 AM	336:15:00	LPRSA0189661	ABC013681				
*			LPRSA0189669	ABC013689				
3/17/53 3:00 PM	4/29/53 11:30 AM	1028:30:00	LPRSA0189669	ABC013689				
4/30/53 5:30 PM	5/8/53 3:45 PM	190:15:00	LPRSA0189669	ABC013689				
*			LPRSA0189669	ABC013689				
6/13/53 5:45 PM	6/15/53 11:00 AM	41:15:00	LPRSA0189674	ABC013694				
6/22/53 10:45 AM	7/2/53 2:45 PM	244:00:00	LPRSA0189677	ABC013697				
7/6/53 8:45 PM	7/7/53 9:15 AM	12:30:00	LPRSA0189681	ABC013701				
7/20/53 9:50 PM	7/21/53 9:25 AM	11:35:00	LPRSA0189682	ABC013702				
7/21/53 4:30 PM	7/22/53 9:00 AM	16:30:00	LPRSA0189683	ABC013703				
7/23/53 9:15 AM	7/24/53 1:15 PM	28:00:00	LPRSA0189684	ABC013704				
8/10/53 1:45 AM	8/10/53 11:15 AM	9:30:00	LPRSA0189685	ABC013705				
8/14/53 2:00 PM	8/15/53 9:15 AM	19:15:00	LPRSA0189686	ABC013706				
10/6/53 7:15 PM	10/7/53 10:15 AM	15:00:00	LPRSA0189689	ABC013709				
10/20/53 9:00 AM	10/29/53 5:15 PM	224:15:00	LPRSA0189690	ABC013710				
11/7/53 8:00 AM	11/8/53 11:30 AM	27:30:00	LPRSA0189695	ABC013715				
*			LPRSA0189653	ABC013673				
11/16/53 10:30 AM								
11/23/53 10:45 AM	11/23/53 3:30 PM	4:45:00	LPRSA0189698	ABC013718				
11/25/53 1:00 PM	11/26/53 9:45 AM	20:45:00	LPRSA0189652	ABC013672				
11/30/53 10:45 AM	12/5/53 8:30 AM	117:45:00	LPRSA0189651	ABC013671				
12/6/53 10:15 AM	12/8/53 9:45 AM	47:30:00	LPRSA0189650	ABC013670				
12/9/53 5:15 PM	12/11/53 9:45 AM	40:30:00	LPRSA0189649	ABC013669				
12/14/53 7:00 AM	12/15/53 1:30 PM	30:30:00	LPRSA0189647	ABC013667				
1/15/54 1:30 PM	1/18/54 10:15 AM	68:45:00	LPRSA0189592	ABC013612				
1/20/54 2:45 PM	1/22/54 1:15 PM	46:30:00	LPRSA0189591	ABC013611				
1/25/54 3:45 AM	2/2/54 1:45 PM	202:00:00	LPRSA0189590	ABC013610				
2/3/54 2:15 PM	2/4/54 10:15 AM	20:00:00	LPRSA0189589	ABC013609				
2/15/54 2:45 PM	2/19/54 2:00 PM	95:15:00	LPRSA0189587	ABC013607				
2/21/54 6:00 PM	2/22/54 9:30 AM	15:30:00	LPRSA0189586	ABC013606				
2/23/54 12:45 PM	2/27/54 9:30 AM	92:45:00	LPRSA0189621	ABC013641				
3/1/54 11:45 AM	3/5/54 2:30 PM	98:45:00	LPRSA0189619	ABC013639				
3/13/54 3:45 PM	3/15/54 10:15 AM	42:30:00	LPRSA0189618	ABC013638				
3/19/54 5:15 PM	3/20/54 2:00 PM	20:45:00	LPRSA0189617	ABC013637				

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**Exhibit 2-4g. Documented PVSC Bypasses at Saybrook Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
3/25/54 10:45 AM	3/26/54 10:30 AM	23:45:00	LPRSA0189616	ABC013636				
4/8/54 2:30 PM	4/9/54 10:15 AM	19:45:00	LPRSA0189613	ABC013633				
4/13/54 1:15 PM	4/13/54 3:10 PM	1:55:00	LPRSA0189623	ABC013643				
4/16/54 1:40 PM	4/18/54 10:40 AM	45:00:00	LPRSA0189632	ABC013652				
4/19/54 4:30 PM	4/21/54 3:45 PM	47:15:00	LPRSA0189615	ABC013635				
4/23/54 2:15 PM	4/25/54 10:15 AM	44:00:00	LPRSA0189614	ABC013634				
4/28/54 4:00 PM	4/29/54 10:15 AM	18:15:00	LPRSA0189612	ABC013632				
5/3/54 11:30 AM	5/27/54 8:30 AM	573:00:00	LPRSA0189631	ABC013651				
6/1/54 12:30 PM	6/9/54 10:45 AM	190:15:00	LPRSA0189630	ABC013650				
6/10/54 2:45 PM	6/11/54 10:00 AM	19:15:00	LPRSA0189629	ABC013649				
7/2/54 9:45 AM	7/2/54 11:30 AM	1:45:00	LPRSA0189627	ABC013647				
7/2/54 2:15 PM	7/2/54 4:15 PM	2:00:00	LPRSA0189626	ABC013646				
7/4/54 1:00 PM	7/6/54 10:00 AM	45:00:00	LPRSA0189625	ABC013645				
7/7/54 5:30 PM	7/8/54 1:45 PM	20:15:00	LPRSA0189624	ABC013644				
7/14/54 5:15 PM	7/15/54 12:45 PM	19:30:00	LPRSA0189634	ABC013654				
7/22/54 4:15 PM	7/23/54 9:45 AM	17:30:00	LPRSA0189633	ABC013653				
8/3/54 10:15 AM	8/4/54 10:15 AM	24:00:00	LPRSA0189620	ABC013640				
8/9/54 10:00 AM	8/11/54 10:30 AM	48:30:00	LPRSA0189622	ABC013642				
8/19/54 11:45 PM	8/20/54 11:00 AM	11:15:00	LPRSA0189611	ABC013631				
8/20/54 7:30 PM	8/22/54 9:30 AM	38:00:00	LPRSA0189610	ABC013630				
8/25/54 5:45 PM	8/26/54 1:45 PM	20:00:00	LPRSA0189609	ABC013629				
9/8/54 3:30 PM	9/9/54 1:45 PM	22:15:00	LPRSA0189607	ABC013627				
9/10/54 2:30 PM	9/12/54 10:15 AM	43:45:00	LPRSA0189606	ABC013626				
10/7/54 10:00 AM	10/8/54 2:15 PM	28:15:00	LPRSA0189604	ABC013624				
10/15/54 12:15 PM	10/16/54 7:45 AM	19:30:00	LPRSA0189603	ABC013623				
10/27/54 5:30 PM	10/28/54 1:45 AM	8:15:00	LPRSA0189602	ABC013622				
10/29/54 10:30 AM	10/30/54 10:00 AM	23:30:00	LPRSA0189601	ABC013621				
11/2/54 2:00 PM	11/5/54 10:00 PM	80:00:00	LPRSA0189600	ABC013620				
11/8/54 2:15 PM	11/9/54 2:15 PM	24:00:00	LPRSA0189599	ABC013619				
11/15/54 10:45 AM	12/2/54 3:30 AM	400:45:00	LPRSA0189597	ABC013617				
12/9/54 3:00 PM	12/10/54 2:15 PM	23:15:00	LPRSA0189596	ABC013616				
12/14/54 10:30 AM	12/15/54 2:00 PM	27:30:00	LPRSA0189595	ABC013615				
12/18/54 11:15 AM	12/19/54 9:15 AM	22:00:00	LPRSA0189593	ABC013613				
12/29/54 2:00 PM	12/30/54 1:45 PM	23:45:00	LPRSA0189585	ABC013605				
1/6/55 3:00 PM	1/7/55 10:15 AM	19:15:00	LPRSA0189582	ABC013602				
1/28/55 10:45 AM	3/9/55 10:45 AM	960:00:00	LPRSA0189580	ABC013600				
4/6/55 3:15 PM	4/7/55 9:30 AM	18:15:00	LPRSA0189575	ABC013595				
4/12/55 3:30 PM	4/15/55 10:00 AM	66:30:00	LPRSA0189574	ABC013594				
5/31/55 2:30 PM	5/31/55 4:45 PM	2:15:00	LPRSA0189572	ABC013592				
6/22/55 12:15 AM	6/22/55 9:30 AM	9:15:00	LPRSA0189571	ABC013591				
8/8/55 1:45 AM	8/8/55 9:15 AM	7:30:00	LPRSA0189570	ABC013590				
8/19/55 12:30 AM	8/20/55 10:15 AM	33:45:00	LPRSA0189567	ABC013587				
8/22/55 11:00 PM	8/24/55 1:45 PM	38:45:00	LPRSA0189566	ABC013586				
9/24/55 7:45 AM	9/26/55 9:30 AM	49:45:00	LPRSA0189563	ABC013583				
10/6/55 9:30 AM	10/7/55 2:15 PM	28:45:00	LPRSA0189562	ABC013582				
10/14/55 10:00 AM	10/25/55 1:30 PM	267:30:00	LPRSA0189561	ABC013581				
10/30/55 11:00 AM	11/1/55 2:30 PM	51:30:00	LPRSA0189560	ABC013580				
11/10/55 5:00 PM	11/12/55 9:45 AM	40:45:00	LPRSA0189559	ABC013579				
11/16/55 10:30 AM	11/18/55 10:45 AM	48:15:00	LPRSA0189558	ABC013578				
1/30/56 2:30 PM	1/31/56 9:30 AM	19:00:00	LPRSA0189556	ABC013576				
2/2/56 1:00 PM	2/3/56 9:30 AM	20:30:00	LPRSA0189555	ABC013575				
4/11/56 4:20 PM	4/12/56 9:55 AM	17:35:00	LPRSA0189545	ABC013565				
6/27/56 4:15 PM	6/27/56 7:15 PM	3:00:00	LPRSA0189542	ABC013562				

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**Exhibit 2-4g. Documented PVSC Bypasses at Saybrook Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
* 5/16/57 12:00 AM	8/25/57 11:59 PM							
* 9/18/57 12:00 AM	12/19/57 11:59 PM							
3/6/59 2:00 AM	3/7/59 11:15 AM	33:15:00	LPRSA0189458	ABC013478				
6/2/59 7:30 PM	6/3/59 9:15 AM	13:45:00	LPRSA0189454	ABC013474				
9/1/59 7:00 PM	9/2/59 8:45 AM	13:45:00	LPRSA0189445	ABC013465				
10/23/58 2:30 AM	10/23/58 3:35 PM	13:05:00	LPRSA0189469	ABC013489				
10/25/58 6:00 PM	10/27/58 2:30 PM	44:30:00	LPRSA0189468	ABC013488				
11/28/58 9:45 PM	11/29/58 11:45 AM	14:00:00	LPRSA0189466	ABC013486				
1/3/60 9:45 AM	1/4/60 3:40 PM	29:55:00	LPRSA0189427	ABC013447				
2/19/60 1:00 AM	2/19/60 1:15 PM	12:15:00	LPRSA0189421	ABC013441				
2/26/60 2:00 AM	2/26/60 10:20 AM	8:20:00	LPRSA0189420	ABC013440				
7/14/60 2:00 PM	7/15/60 8:15 AM	18:15:00	LPRSA0189404	ABC013424				
8/19/60 4:00 PM	8/20/60 9:40 AM	17:40:00	LPRSA0189399	ABC013419				
9/12/60 10:05 AM	9/13/60 10:00 AM	23:55:00	LPRSA0189397	ABC013417				
9/19/60 11:30 AM	9/21/60 9:50 PM	58:20:00	LPRSA0189396	ABC013416				
12/21/60 11:15 AM	12/22/60 11:05 AM	23:50:00	LPRSA0189391	ABC013411				
3/14/61 8:55 AM	3/14/61 2:15 PM	5:20:00	LPRSA0189382	ABC013402				
3/23/61 3:00 PM	3/24/61 11:00 AM	20:00:00	LPRSA0189383	ABC013403				
4/10/61 11:30 AM	4/11/61 8:40 AM	21:10:00	LPRSA0189376	ABC013396				
4/13/61 9:50 AM	4/14/61 8:45 AM	22:55:00	LPRSA0189375	ABC013395				
4/16/61 1:25 PM	4/17/61 9:10 AM	19:45:00	LPRSA0189373	ABC013393				
4/25/61 8:30 PM	4/26/61 8:30 AM	12:00:00	LPRSA0189369	ABC013389				
7/20/61 12:30 PM	7/21/61 9:15 AM	20:45:00	LPRSA0189357	ABC013377				
9/20/61 2:05 PM	9/22/61 10:20 AM	44:15:00	LPRSA0189348	ABC013368				
12/18/61 12:15 PM	12/20/61 8:50 AM	44:35:00	LPRSA0189338	ABC013358				
2/26/62 1:25 PM	2/27/62 8:55 AM	19:30:00	LPRSA0189329	ABC013349				
2/27/62 2:00 PM	3/1/62 9:05 AM	43:05:00	LPRSA0189329	ABC013349				
3/12/62 8:40 AM	3/13/62 3:10 PM	30:30:00	LPRSA0189327	ABC013347				
9/5/62 1:25 PM	9/6/62 1:20 PM	23:55:00	LPRSA0189301	ABC013321				
9/17/62 7:30 PM	9/18/62 1:30 PM	18:00:00	LPRSA0189299	ABC013319				
9/27/62 12:30 PM	9/28/62 2:00 PM	25:30:00	LPRSA0189296	ABC013316				
10/5/62 8:00 AM	10/6/62 9:50 AM	25:50:00	LPRSA0189295	ABC013315				
11/3/62 10:35 AM	11/5/62 9:25 AM	46:50:00	LPRSA0189288	ABC013308				
11/9/62 3:20 PM	11/11/62 10:55 AM	43:35:00	LPRSA0189287	ABC013307				
11/18/62 2:00 PM	11/19/62 8:50 AM	18:50:00	LPRSA0189285	ABC013305				
11/21/62 11:00 PM	11/23/62 10:05 AM	35:05:00	LPRSA0189284	ABC013304				
12/5/62 10:05 AM	12/6/62 2:45 PM	28:40:00	LPRSA0189283	ABC013303				
12/22/62 12:40 PM	12/24/62 10:00 AM	45:20:00	LPRSA0189282	ABC013302				
* 1/1/63 12:00 AM	9/30/75 11:59 PM							

Subtotal	12493:50:00
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* Missing data.

Source: PVSC throw-out logs.

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NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

**Exhibit 2-4g. Documented PVSC Bypasses at Saybrook Place
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
(1974-1975)							
10/16/74 10:00 AM	10/17/74 9:00 PM	35:00:00	LPRSA0195712				
12/2/74 6:00 AM	12/3/74 10:00 AM	28:00:00	LPRSA0195714				
1/8/75	1/8/75	0:00:00	LPRSA0197017	*	*		
4/3/75 9:00 AM	4/4/75 12:00 AM	15:00:00	LPRSA0195718				
6/6/75 1:00 AM	6/6/75 9:00 AM	8:00:00	LPRSA0195720				
6/6/75 5:00 PM	6/7/75 1:00 AM	8:00:00	LPRSA0195720				
6/12/75 11:00 AM	6/13/75 2:00 PM	27:00:00	LPRSA0195720				
6/29/75	6/29/75	0:00:00	LPRSA0197018	*	*		
7/7/75 9:00 AM	7/7/75 10:00 PM	13:00:00	LPRSA0195721				
7/9/75 7:00 PM	7/10/75 3:00 AM	8:00:00	LPRSA0195721				
7/13/75 2:00 PM	7/14/75 9:00 AM	19:00:00	LPRSA0195721				
7/14/75 12:00 PM	7/17/75 9:00 AM	69:00:00	LPRSA0195721				
7/25/75 2:00 AM	7/25/75 2:00 PM	12:00:00	LPRSA0195721				
9/23/75 3:00 AM	9/28/75 10:00 AM	127:00:00	LPRSA0195722				
*	10/1/75	12/31/04					
Subtotal		369:00:00		18.54	1.94	121.2	1,966
Estimated Mass/Bypass Time (lb/hr)							782
Estimated Bypassed Volume Rate (MG/hr)				0.773			

* Tide gates not functioning properly and bypasses not measured; overflow data are used to calculate average mass and volume.

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

(2005-2014)

		Elapsed Time (hours)	Frequency of Overflows (#/yr)
1/1/2005	12/31/2005	430.13	35
1/1/2006	12/31/2006	665.85	49
1/1/2007	12/31/2007	437.60	36
1/1/2008	12/31/2008	607.02	46
1/1/2009	12/31/2009	504.90	52
1/1/2010	12/31/2010	448.16	39
1/1/2011	12/31/2011	671.17	62
1/1/2012	12/31/2012	172.94	38
1/1/2013	12/31/2013	254.64	21
1/1/2014	12/31/2014	254.64	21
*	1/1/2015	9/30/2016	
Subtotal (2005-2014)		4447.05	
Average annual bypass time (hr)		444.71	

* Missing data.

Source: PVSC, NJPDES permit reports to NJDEP, CSO Regulator Events, 2008-2015.

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**Exhibit 2-4h. Documented PVSC Bypasses at City Dock
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1950-1962)

*	8/2/24 12:00 PM	10/3/50 11:59 PM	LPRSA0198629				
	10/4/50 10:00 PM	10/5/50 11:30 AM	13:30:00 LPRSA0188654	ABC012674			
	10/10/50 2:30 AM	10/10/50 1:00 PM	10:30:00 LPRSA0188652	ABC012672			
	10/12/50 1:30 PM	10/13/50 11:00 AM	21:30:00 LPRSA0188650	ABC012670			
	10/23/50 1:30 PM	10/24/50 9:00 AM	19:30:00 LPRSA0188648	ABC012668			
	11/20/50 6:00 PM	11/21/50 9:00 AM	15:00:00 LPRSA0188646	ABC012666			
	11/25/50 9:00 AM	11/25/50 1:00 PM	4:00:00 LPRSA0188643	ABC012663			
	12/4/50 12:30 PM	12/5/50 9:30 AM	21:00:00 LPRSA0188641	ABC012661			
	12/7/50 4:00 PM	12/8/50 11:30 AM	19:30:00 LPRSA0188637	ABC012657			
	12/15/50 10:30 PM	12/16/50 2:30 PM	16:00:00 LPRSA0188639	ABC012659			
	12/29/50 12:30 PM	12/30/50 11:30 AM	23:00:00 LPRSA0188635	ABC012655			
	1/7/51 5:00 PM	1/8/51 9:00 AM	16:00:00 LPRSA0188633	ABC012653			
	1/11/51 5:30 PM	1/12/51 8:30 AM	15:00:00 LPRSA0188619	ABC012639			
	1/14/51 6:00 PM	1/15/51 12:00 PM	18:00:00 LPRSA0188631	ABC012651			
	1/23/51 2:00 AM	1/24/51 2:00 PM	36:00:00 LPRSA0188621	ABC012641			
*	1/25/51 4:00 PM	1/26/51 10:00 AM	18:00:00 LPRSA0188623	ABC012643			
	1/28/51 5:00 PM	1/30/51 10:00 AM	41:00:00 LPRSA0188625	ABC012645			
	1/31/51 4:00 PM	2/2/51 10:00 AM	42:00:00 LPRSA0188628	ABC012648			
	2/10/51 5:30 AM	2/10/51 2:30 PM	9:00:00 LPRSA0188588	ABC012608			
	2/11/51 6:00 PM	2/15/51 2:30 PM	92:30:00 LPRSA0188588	ABC012608			
	2/17/51 4:00 AM	2/18/51 11:30 AM	31:30:00 LPRSA0188588	ABC012608			
	2/19/51 5:00 PM	2/20/51 2:30 PM	21:30:00 LPRSA0188596	ABC012616			
	2/23/51 8:30 AM	2/23/51 10:00 AM	1:30:00 LPRSA0188596	ABC012616			
	3/1/51 1:00 PM	3/2/51 10:00 AM	21:00:00 LPRSA0188604	ABC012624			
	3/3/51 3:00 PM	3/5/51 10:30 AM	43:30:00 LPRSA0188606	ABC012626			
	3/13/51 4:30 PM	3/15/51 9:30 AM	41:00:00 LPRSA0188609	ABC012629			
	3/16/51 4:00 PM	3/19/51 9:30 AM	65:30:00 LPRSA0188612	ABC012632			
	3/19/51 5:00 PM	3/21/51 9:00 AM	40:00:00 LPRSA0188616	ABC012636			
	3/22/51 12:00 AM	12/31/51 11:59 PM					
	2/17/52 3:30 AM	2/19/52 11:00 AM	55:30:00 LPRSA0189755	ABC013775			
	2/20/52 6:00 PM	2/22/52 10:30 AM	40:30:00 LPRSA0189754	ABC013774			
	2/29/52 9:00 PM	3/7/52 10:30 AM	157:30:00 LPRSA0189753	ABC013773			
	3/11/52 5:00 AM	3/18/52 10:30 AM	173:30:00 LPRSA0189752	ABC013772			
	3/19/52 10:30 AM	3/21/52 11:00 AM	48:30:00 LPRSA0189751	ABC013771			
	3/22/52 5:00 PM	3/26/52 11:00 AM	90:00:00 LPRSA0189750	ABC013770			
	4/5/52 8:00 AM	4/7/52 11:00 AM	51:00:00 LPRSA0189749	ABC013769			
	4/14/52 4:00 AM	4/17/52 11:00 AM	79:00:00 LPRSA0189748	ABC013768			
	4/25/52 11:00 AM	5/9/52 4:30 PM	341:30:00 LPRSA0189744	ABC013764			
	5/11/52 10:00 PM	5/14/52 2:30 PM	64:30:00 LPRSA0189743	ABC013763			
	5/18/52 8:45 AM	5/23/52 3:30 PM	126:45:00 LPRSA0189741	ABC013761			
	5/25/52 10:15 AM	5/27/52 1:30 PM	51:15:00 LPRSA0189740	ABC013760			
	5/29/52 4:15 PM	6/14/52 10:30 AM	378:15:00 LPRSA0189736	ABC013756			
	6/17/52 6:15 PM	6/18/52 2:30 PM	20:15:00 LPRSA0189735	ABC013755			
	6/19/52 2:15 PM	6/20/52 9:00 AM	18:45:00 LPRSA0189734	ABC013754			
	6/27/52 4:40 PM	6/28/52 9:30 AM	16:50:00 LPRSA0189729	ABC013749			
	6/29/52 2:00 AM	6/30/52 10:50 AM	32:50:00 LPRSA0189728	ABC013748			
	7/8/52 5:00 PM	7/10/52 4:15 PM	47:15:00 LPRSA0189730	ABC013750			
	7/21/52 5:15 PM	7/22/52 1:30 PM	20:15:00 LPRSA0189725	ABC013745			
	7/31/52 5:25 PM	8/1/52 10:25 AM	17:00:00 LPRSA0189724	ABC013744			
	8/2/52 5:00 PM	8/3/52 10:15 AM	17:15:00 LPRSA0189725	ABC013745			
	8/6/52 4:00 PM	8/11/52 10:00 AM	114:00:00 LPRSA0189715	ABC013735			

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**Exhibit 2-4h. Documented PVSC Bypasses at City Dock
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source	Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
*	8/12/52 6:00 PM		LPRSA0189721	ABC013741				
	8/15/52 5:45 PM	8/17/52 9:45 AM	40:00:00	LPRSA0189714	ABC013734			
	8/21/52 5:15 PM	8/22/52 1:30 PM	20:15:00	LPRSA0189713	ABC013733			
	8/30/52 10:45 AM	9/2/52 9:45 AM	71:00:00	LPRSA0189712	ABC013732			
	9/2/52 5:45 PM	9/4/52 9:30 AM	39:45:00	LPRSA0189711	ABC013731			
	9/15/52 5:15 PM	9/17/52 5:45 PM	48:30:00	LPRSA0189709	ABC013729			
	9/18/52 1:45 PM	9/20/52 9:45 AM	44:00:00	LPRSA0189710	ABC013730			
	9/23/52 11:15 AM	9/24/52 10:00 AM	22:45:00	LPRSA0189708	ABC013728			
	10/2/52 7:45 PM	10/3/52 2:15 PM	18:30:00	LPRSA0189707	ABC013727			
	10/28/52 6:15 PM	10/29/52 9:45 AM	15:30:00	LPRSA0189706	ABC013726			
	11/3/52 2:45 PM	11/4/52 9:45 AM	19:00:00	LPRSA0189703	ABC013723			
	11/10/52 5:15 PM	11/11/52 9:45 AM	16:30:00	LPRSA0189704	ABC013724			
	11/14/52 2:15 PM	12/1/52 2:15 PM	408:00:00	LPRSA0189701	ABC013721			
	12/2/52 2:45 PM	12/8/52 9:30 AM	138:45:00	LPRSA0189702	ABC013722			
	12/9/52 8:45 AM	1/18/53 3:15 PM	966:30:00	LPRSA0189655	ABC013675			
	1/21/53 3:45 PM	1/22/53 1:30 PM	21:45:00	LPRSA0189656	ABC013676			
	1/24/53 10:45 AM	1/25/53 10:30 AM	23:45:00	LPRSA0189657	ABC013677			
	2/11/53 6:00 PM	2/13/53 11:00 AM	41:00:00	LPRSA0189658	ABC013678			
	2/15/53 11:45 AM	2/16/53 2:30 PM	26:45:00	LPRSA0189659	ABC013679			
	2/25/53 9:45 AM	3/11/53 10:00 AM	336:15:00	LPRSA0189661	ABC013681			
*		3/14/53 1:15 PM		LPRSA0189670	ABC013690			
	3/17/53 3:15 PM	4/28/53 1:30 PM	1006:15:00	LPRSA0189670	ABC013690			
	4/29/53 9:30 AM	4/29/53 3:30 PM	6:00:00	LPRSA0189670	ABC013690			
	4/30/53 5:45 PM	5/8/53 4:00 PM	190:15:00	LPRSA0189670	ABC013690			
*	5/8/53 11:30 AM			LPRSA0189670	ABC013690			
	6/13/53 6:00 PM	6/15/53 11:15 AM	41:15:00	LPRSA0189674	ABC013694			
	6/22/53 11:00 AM	7/2/53 3:00 PM	244:00:00	LPRSA0189677	ABC013697			
	7/6/53 9:00 PM	7/7/53 9:30 AM	12:30:00	LPRSA0189681	ABC013701			
	7/20/53 10:00 PM	7/21/53 9:35 AM	11:35:00	LPRSA0189682	ABC013702			
	7/21/53 4:45 PM	7/22/53 9:15 AM	16:30:00	LPRSA0189683	ABC013703			
	7/23/53 9:25 AM	7/24/53 1:30 PM	28:05:00	LPRSA0189684	ABC013704			
	8/14/53 2:15 PM	8/15/53 9:30 AM	19:15:00	LPRSA0189686	ABC013706			
	10/6/53 7:30 PM	10/7/53 10:30 AM	15:00:00	LPRSA0189689	ABC013709			
	10/20/53 9:15 AM	10/29/53 5:30 PM	224:15:00	LPRSA0189690	ABC013710			
	11/7/53 8:15 AM	11/8/53 11:45 AM	27:30:00	LPRSA0189695	ABC013715			
*	11/16/53 10:45 AM			LPRSA0189653	ABC013673			
	11/23/53 11:00 AM	11/23/53 3:15 PM	4:15:00	LPRSA0189698	ABC013718			
	11/25/53 1:15 PM	11/26/53 10:00 AM	20:45:00	LPRSA0189652	ABC013672			
	11/30/53 11:00 AM	12/5/53 8:45 AM	117:45:00	LPRSA0189651	ABC013671			
	12/6/53 10:30 AM	12/8/53 10:00 AM	47:30:00	LPRSA0189650	ABC013670			
	12/9/53 5:30 PM	12/11/53 10:00 AM	40:30:00	LPRSA0189649	ABC013669			
	12/14/53 7:15 AM	12/15/53 1:45 PM	30:30:00	LPRSA0189647	ABC013667			
	1/15/54 2:00 PM	1/18/54 10:45 AM	68:45:00	LPRSA0189592	ABC013612			
	1/20/54 3:00 PM	1/22/54 1:30 PM	46:30:00	LPRSA0189591	ABC013611			
	1/25/54 4:00 AM	2/2/54 2:00 PM	202:00:00	LPRSA0189590	ABC013610			
	2/3/54 2:30 PM	2/4/54 10:30 AM	20:00:00	LPRSA0189589	ABC013609			
	2/15/54 3:00 PM	2/19/54 2:15 PM	95:15:00	LPRSA0189587	ABC013607			
	2/21/54 6:15 PM	2/22/54 9:45 AM	15:30:00	LPRSA0189586	ABC013606			
	2/23/54 1:00 PM	2/27/54 9:45 AM	92:45:00	LPRSA0189621	ABC013641			
	3/1/54 12:00 PM	3/5/54 2:45 PM	98:45:00	LPRSA0189619	ABC013639			
	3/13/54 4:00 PM	3/15/54 10:30 AM	42:30:00	LPRSA0189618	ABC013638			
	3/19/54 5:30 PM	3/20/54 1:40 PM	20:10:00	LPRSA0189617	ABC013637			
	3/25/54 11:00 AM	3/26/54 10:45 AM	23:45:00	LPRSA0189616	ABC013636			

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**Exhibit 2-4h. Documented PVSC Bypasses at City Dock
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
4/8/54 2:45 PM	4/9/54 10:30 AM	19:45:00	LPRSA0189613	ABC013633			
4/13/54 1:30 PM	4/13/54 3:00 PM	1:30:00	LPRSA0189623	ABC013643			
4/16/54 1:50 PM	4/18/54 10:50 AM	45:00:00	LPRSA0189632	ABC013652			
4/19/54 4:45 PM	4/21/54 3:30 PM	46:45:00	LPRSA0189615	ABC013635			
4/23/54 2:30 PM	4/25/54 10:30 AM	44:00:00	LPRSA0189614	ABC013634			
4/28/54 4:15 PM	4/29/54 10:30 AM	18:15:00	LPRSA0189612	ABC013632			
5/3/54 11:45 AM	5/26/54 9:45 AM	550:00:00	LPRSA0189631	ABC013651			
6/1/54 12:45 PM	6/3/54 4:30 PM	51:45:00	LPRSA0189630	ABC013650			
7/2/54 10:00 AM	7/2/54 5:00 PM	7:00:00	LPRSA0189626	ABC013646			
7/4/54 1:15 PM	7/4/54 2:30 PM	1:15:00	LPRSA0189625	ABC013645			
9/10/54 2:45 PM	9/12/54 10:30 AM	43:45:00	LPRSA0189606	ABC013626			
* 5/16/57 12:00 AM	8/25/57 11:59 PM						
* 9/18/57 12:00 AM	12/19/57 11:59 PM						
9/12/60 12:20 PM	9/13/60 9:30 AM	21:10:00	LPRSA0189397	ABC013417			
* 1/1/63 12:00 AM	12/31/74 11:59 PM						
Subtotal		8676:55:00					

* Missing data.

Source: PVSC throw-out logs.

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**Exhibit 2-4h. Documented PVSC Bypasses at City Dock
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1975)

	1/1/75	1/1/75	0:00:00 LPRSA0197075	*	*		
	7/20/75	7/20/75	0:00:00 LPRSA0197076	*	*		
*	7/21/75	12/31/04					
*	Average Overflow			42.5	1.62	260	3,517
	Estimated Mass/Bypass Time (lb/hr)						3,845
	Estimated Bypassed Volume Rate (MG/hr)			1.771			

* Note: Regulator appeared inoperable and tide gates were closed; overflow data are used to calculate average mass and volume.

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

(2005-2014)

		Elapsed Time (hours)	Frequency of Overflows (#/yr)	
	1/1/2005	12/31/2005	447.37	36
	1/1/2006	12/31/2006	656.49	47
	1/1/2007	12/31/2007	367.35	23
	1/1/2008	12/31/2008	561.00	35
	1/1/2009	12/31/2009	505.69	52
	1/1/2010	12/31/2010	459.27	39
	1/1/2011	12/31/2011	597.82	60
	1/1/2012	12/31/2012	181.96	39
	1/1/2013	12/31/2013	310.70	33
	1/1/2014	12/31/2014	310.70	33
*	1/1/2015	9/30/2016		
Subtotal (2005-2014)			4398.35	
Average annual bypass time (hr)			439.84	

* Missing data.

Source: PVSC, NJPDES permit reports to NJDEP, CSO Regulator Events, 2008-2015.

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**Exhibit 2-4i. Documented PVSC Bypasses at Jackson Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1950-1962)

*	8/2/24 12:00 PM	10/3/50 11:59 PM	LPRSA0198629				
	10/4/50 10:00 PM	10/5/50 11:30 AM	13:30:00 LPRSA0188654	ABC012674			
	10/10/50 2:30 AM	10/10/50 1:00 PM	10:30:00 LPRSA0188652	ABC012672			
	10/12/50 1:30 PM	10/13/50 11:00 AM	21:30:00 LPRSA0188650	ABC012670			
	10/23/50 1:30 PM	10/24/50 9:00 AM	19:30:00 LPRSA0188648	ABC012668			
	11/20/50 6:00 PM	11/21/50 9:00 AM	15:00:00 LPRSA0188646	ABC012666			
	11/25/50 9:00 AM	11/25/50 1:00 PM	4:00:00 LPRSA0188643	ABC012663			
	12/4/50 12:30 PM	12/5/50 9:30 AM	21:00:00 LPRSA0188641	ABC012661			
	12/7/50 4:00 PM	12/8/50 11:30 AM	19:30:00 LPRSA0188637	ABC012657			
	12/15/50 10:30 PM	12/16/50 2:30 PM	16:00:00 LPRSA0188639	ABC012659			
	12/29/50 12:30 PM	12/30/50 11:30 AM	23:00:00 LPRSA0188635	ABC012655			
	1/7/51 5:00 PM	1/8/51 9:00 AM	16:00:00 LPRSA0188633	ABC012653			
	1/11/51 5:30 PM	1/12/51 8:30 AM	15:00:00 LPRSA0188619	ABC012639			
	1/14/51 6:00 PM	1/15/51 12:00 PM	18:00:00 LPRSA0188631	ABC012651			
	1/23/51 2:00 AM	1/24/51 2:00 PM	36:00:00 LPRSA0188621	ABC012641			
	1/25/51 4:00 PM	1/26/51 10:00 AM	18:00:00 LPRSA0188623	ABC012643			
	1/28/51 5:00 PM	1/30/51 10:00 AM	41:00:00 LPRSA0188625	ABC012645			
	1/31/51 4:00 PM	2/2/51 10:00 AM	42:00:00 LPRSA0188628	ABC012648			
	2/10/51 5:30 AM	2/10/51 2:30 PM	9:00:00 LPRSA0188588	ABC012608			
	2/11/51 6:00 PM	2/15/51 2:30 PM	92:30:00 LPRSA0188588	ABC012608			
	2/17/51 4:00 AM	2/18/51 11:30 AM	31:30:00 LPRSA0188588	ABC012608			
	2/19/51 5:00 PM	2/20/51 2:30 PM	21:30:00 LPRSA0188596	ABC012616			
	2/23/51 8:30 AM	2/23/51 10:00 AM	1:30:00 LPRSA0188596	ABC012616			
	3/1/51 1:00 PM	3/2/51 10:00 AM	21:00:00 LPRSA0188604	ABC012624			
	3/3/51 3:00 PM	3/5/51 10:30 AM	43:30:00 LPRSA0188606	ABC012626			
	3/13/51 4:30 PM	3/15/51 9:30 AM	41:00:00 LPRSA0188609	ABC012629			
	3/16/51 4:00 PM	3/19/51 9:30 AM	65:30:00 LPRSA0188612	ABC012632			
	3/19/51 5:00 PM	3/21/51 9:00 AM	40:00:00 LPRSA0188616	ABC012636			
*	3/22/51 12:00 AM	12/31/51 11:59 PM					
	2/17/52 3:30 AM	2/19/52 11:00 AM	55:30:00 LPRSA0189755	ABC013775			
	2/20/52 6:00 PM	2/22/52 10:30 AM	40:30:00 LPRSA0189754	ABC013774			
	2/29/52 9:00 PM	3/7/52 10:30 AM	157:30:00 LPRSA0189753	ABC013773			
	3/11/52 5:00 AM	3/18/52 10:30 AM	173:30:00 LPRSA0189752	ABC013772			
	3/19/52 10:30 AM	3/21/52 11:00 AM	48:30:00 LPRSA0189751	ABC013771			
	3/22/52 5:00 PM	3/26/52 11:00 AM	90:00:00 LPRSA0189750	ABC013770			
	4/5/52 8:00 AM	4/7/52 11:00 AM	51:00:00 LPRSA0189749	ABC013769			
	4/14/52 4:00 AM	4/17/52 11:00 AM	79:00:00 LPRSA0189748	ABC013768			
	4/25/52 11:00 AM	5/9/52 4:30 PM	341:30:00 LPRSA0189744	ABC013764			
	5/11/52 10:00 PM	5/14/52 2:30 PM	64:30:00 LPRSA0189743	ABC013763			
	5/18/52 9:00 AM	5/23/52 3:45 PM	126:45:00 LPRSA0189741	ABC013761			
	5/25/52 10:30 AM	5/27/52 1:45 PM	51:15:00 LPRSA0189740	ABC013760			
	5/29/52 4:40 PM	6/14/52 10:45 AM	378:05:00 LPRSA0189736	ABC013756			
	6/17/52 6:30 PM	6/18/52 3:00 PM	20:30:00 LPRSA0189735	ABC013755			
	6/19/52 2:00 PM	6/20/52 8:45 AM	18:45:00 LPRSA0189734	ABC013754			
	6/27/52 4:50 PM	6/28/52 9:45 AM	16:55:00 LPRSA0189729	ABC013749			
	6/29/52 2:30 AM	6/30/52 11:00 AM	32:30:00 LPRSA0189728	ABC013748			
	7/8/52 5:15 PM	7/10/52 4:00 PM	46:45:00 LPRSA0189730	ABC013750			
	7/21/52 5:30 PM	7/22/52 1:45 PM	20:15:00 LPRSA0189725	ABC013745			
	7/31/52 5:35 PM	8/1/52 10:35 AM	17:00:00 LPRSA0189724	ABC013744			
	8/2/52 5:15 PM	8/3/52 10:30 AM	17:15:00 LPRSA0189725	ABC013745			
	8/6/52 4:15 PM	8/11/52 10:15 AM	114:00:00 LPRSA0189715	ABC013735			

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**Exhibit 2-4i. Documented PVSC Bypasses at Jackson Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
8/12/52 6:15 PM	8/14/52 9:45 AM	39:30:00	LPRSA0189721	ABC013741				
8/15/52 6:00 PM	8/17/52 10:00 AM	40:00:00	LPRSA0189714	ABC013734				
8/21/52 5:30 PM	8/22/52 1:45 PM	20:15:00	LPRSA0189713	ABC013733				
8/30/52 11:00 AM	9/2/52 10:00 AM	71:00:00	LPRSA0189712	ABC013732				
9/2/52 6:00 PM	9/4/52 9:45 AM	39:45:00	LPRSA0189711	ABC013731				
9/15/52 5:30 PM	9/17/52 6:00 PM	48:30:00	LPRSA0189709	ABC013729				
9/18/52 2:00 PM	9/20/52 10:00 AM	44:00:00	LPRSA0189710	ABC013730				
9/23/52 11:30 AM	9/24/52 10:15 AM	22:45:00	LPRSA0189708	ABC013728				
10/2/52 8:00 PM	10/3/52 2:30 PM	18:30:00	LPRSA0189707	ABC013727				
10/28/52 6:30 PM	10/29/52 10:00 AM	15:30:00	LPRSA0189706	ABC013726				
11/3/52 3:00 PM	11/4/52 10:00 AM	19:00:00	LPRSA0189703	ABC013723				
11/10/52 5:30 PM	11/11/52 10:00 AM	16:30:00	LPRSA0189704	ABC013724				
11/14/52 2:30 PM	12/1/52 2:30 PM	408:00:00	LPRSA0189701	ABC013721				
12/2/52 3:00 PM	12/8/52 9:45 AM	138:45:00	LPRSA0189702	ABC013722				
12/9/52 9:00 AM	1/18/53 3:30 PM	966:30:00	LPRSA0189655	ABC013675				
1/21/53 4:00 PM	1/22/53 1:45 PM	21:45:00	LPRSA0189656	ABC013676				
1/24/53 11:00 AM	1/25/53 10:45 AM	23:45:00	LPRSA0189657	ABC013677				
2/11/53 6:15 PM	2/13/53 11:15 AM	41:00:00	LPRSA0189658	ABC013678				
2/15/53 12:00 PM	2/16/53 2:45 PM	26:45:00	LPRSA0189659	ABC013679				
2/25/53 10:00 AM	3/11/53 10:15 AM	336:15:00	LPRSA0189661	ABC013681				
*	3/14/53 1:30 PM		LPRSA0189671	ABC013691				
	3/17/53 3:30 PM	1027:30:00	LPRSA0189671	ABC013691				
	4/30/53 6:20 PM	189:55:00	LPRSA0189671	ABC013691				
*	5/8/53 10:30 AM		LPRSA0189671	ABC013691				
	6/13/53 6:15 PM	41:15:00	LPRSA0189674	ABC013694				
	6/22/53 11:15 AM	244:00:00	LPRSA0189677	ABC013697				
	7/6/53 9:15 PM	12:30:00	LPRSA0189681	ABC013701				
	7/20/53 10:15 PM	11:45:00	LPRSA0189682	ABC013702				
	7/21/53 5:10 PM	16:20:00	LPRSA0189683	ABC013703				
	7/23/53 9:35 AM	28:10:00	LPRSA0189684	ABC013704				
	8/14/53 2:30 PM	19:15:00	LPRSA0189686	ABC013706				
	10/20/53 9:30 AM	224:15:00	LPRSA0189690	ABC013710				
	11/7/53 8:30 AM	27:30:00	LPRSA0189695	ABC013715				
*	11/16/53 11:00 AM		LPRSA0189653	ABC013673				
	11/23/53 11:15 AM	3:45:00	LPRSA0189698	ABC013718				
	11/25/53 1:30 PM	20:45:00	LPRSA0189652	ABC013672				
	11/30/53 11:15 AM	117:45:00	LPRSA0189651	ABC013671				
	12/6/53 10:45 AM	47:30:00	LPRSA0189650	ABC013670				
	12/9/53 5:45 PM	40:30:00	LPRSA0189649	ABC013669				
	12/14/53 7:30 AM	30:30:00	LPRSA0189647	ABC013667				
1/15/54 2:15 PM	1/18/54 11:00 AM	68:45:00	LPRSA0189592	ABC013612				
1/20/54 3:15 PM	1/22/54 1:45 PM	46:30:00	LPRSA0189591	ABC013611				
1/25/54 4:15 AM	2/2/54 2:15 PM	202:00:00	LPRSA0189590	ABC013610				
2/3/54 2:45 PM	2/4/54 10:45 AM	20:00:00	LPRSA0189589	ABC013609				
2/15/54 3:15 PM	2/19/54 2:30 PM	95:15:00	LPRSA0189587	ABC013607				
2/21/54 6:30 PM	2/22/54 10:00 AM	15:30:00	LPRSA0189586	ABC013606				
2/23/54 1:15 PM	2/27/54 10:00 AM	92:45:00	LPRSA0189621	ABC013641				
3/1/54 12:15 PM	3/5/54 3:00 PM	98:45:00	LPRSA0189619	ABC013639				
3/13/54 4:15 PM	3/15/54 10:45 AM	42:30:00	LPRSA0189618	ABC013638				
3/19/54 5:45 PM	3/20/54 1:25 PM	19:40:00	LPRSA0189617	ABC013637				
3/25/54 11:15 AM	3/26/54 11:00 AM	23:45:00	LPRSA0189616	ABC013636				
4/8/54 3:00 PM	4/9/54 10:45 AM	19:45:00	LPRSA0189613	ABC013633				
4/13/54 1:45 PM	4/13/54 2:50 PM	1:05:00	LPRSA0189623	ABC013643				

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**Exhibit 2-4i. Documented PVSC Bypasses at Jackson Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
4/16/54 2:00 PM	4/18/54 11:00 AM	45:00:00	LPRSA0189632	ABC013652				
4/19/54 5:00 PM	4/21/54 3:15 PM	46:15:00	LPRSA0189615	ABC013635				
4/23/54 2:45 PM	4/25/54 10:45 AM	44:00:00	LPRSA0189614	ABC013634				
4/28/54 4:30 PM	4/29/54 10:45 AM	18:15:00	LPRSA0189612	ABC013632				
5/3/54 12:00 PM	5/26/54 10:00 AM	550:00:00	LPRSA0189631	ABC013651				
6/1/54 1:00 PM	6/9/54 11:15 AM	190:15:00	LPRSA0189630	ABC013650				
6/10/54 2:30 PM	6/11/54 10:15 AM	19:45:00	LPRSA0189629	ABC013649				
7/2/54 10:15 AM	7/2/54 5:15 PM	7:00:00	LPRSA0189626	ABC013646				
7/4/54 1:30 PM	7/5/54 10:15 AM	20:45:00	LPRSA0189625	ABC013645				
7/7/54 5:45 PM	7/8/54 2:00 PM	20:15:00	LPRSA0189624	ABC013644				
7/14/54 5:30 PM	7/15/54 1:00 PM	19:30:00	LPRSA0189634	ABC013654				
7/22/54 4:30 PM	7/23/54 10:00 AM	17:30:00	LPRSA0189633	ABC013653				
8/3/54 10:30 AM	8/4/54 10:30 AM	24:00:00	LPRSA0189620	ABC013640				
8/9/54 10:15 AM	8/11/54 10:45 AM	48:30:00	LPRSA0189622	ABC013642				
8/19/54 12:00 AM	8/20/54 11:15 AM	35:15:00	LPRSA0189611	ABC013631				
8/20/54 7:45 PM	8/22/54 9:45 AM	38:00:00	LPRSA0189610	ABC013630				
8/25/54 6:00 PM	8/26/54 2:00 PM	20:00:00	LPRSA0189609	ABC013629				
9/8/54 3:45 PM	9/9/54 2:00 PM	22:15:00	LPRSA0189607	ABC013627				
9/10/54 3:00 PM	9/12/54 10:45 AM	43:45:00	LPRSA0189606	ABC013626				
10/7/54 10:15 AM	10/8/54 2:30 PM	28:15:00	LPRSA0189604	ABC013624				
10/15/54 12:30 PM	10/16/54 8:00 AM	19:30:00	LPRSA0189603	ABC013623				
10/27/54 5:45 PM	10/28/54 2:00 AM	8:15:00	LPRSA0189602	ABC013622				
10/29/54 10:45 AM	10/30/54 10:15 AM	23:30:00	LPRSA0189601	ABC013621				
11/2/54 2:15 PM	11/5/54 3:15 PM	73:00:00	LPRSA0189600	ABC013620				
11/8/54 2:30 PM	11/9/54 2:30 PM	24:00:00	LPRSA0189599	ABC013619				
11/15/54 11:00 AM	12/2/54 3:45 AM	400:45:00	LPRSA0189597	ABC013617				
12/9/54 3:15 PM	12/10/54 2:30 PM	23:15:00	LPRSA0189596	ABC013616				
12/14/54 10:45 AM	12/15/54 2:15 PM	27:30:00	LPRSA0189595	ABC013615				
12/18/54 11:30 AM	12/19/54 9:30 AM	22:00:00	LPRSA0189593	ABC013613				
12/29/54 2:15 PM	12/30/54 1:30 PM	23:15:00	LPRSA0189585	ABC013605				
1/6/55 3:15 PM	1/7/55 10:30 AM	19:15:00	LPRSA0189582	ABC013602				
1/28/55 11:00 AM	3/9/55 11:00 AM	960:00:00	LPRSA0189580	ABC013600				
4/6/55 3:30 PM	4/7/55 9:45 AM	18:15:00	LPRSA0189575	ABC013595				
4/12/55 3:45 PM	4/15/55 10:15 AM	66:30:00	LPRSA0189574	ABC013594				
5/31/55 2:45 PM	5/31/55 5:00 PM	2:15:00	LPRSA0189572	ABC013592				
6/22/55 12:30 AM	6/22/55 9:45 AM	9:15:00	LPRSA0189571	ABC013591				
8/8/55 1:30 AM	8/8/55 9:30 AM	8:00:00	LPRSA0189570	ABC013590				
8/19/55 12:45 AM	8/20/55 10:30 AM	33:45:00	LPRSA0189567	ABC013587				
8/22/55 11:15 PM	8/24/55 2:00 PM	38:45:00	LPRSA0189566	ABC013586				
9/24/55 8:00 AM	9/26/55 9:45 AM	49:45:00	LPRSA0189563	ABC013583				
10/6/55 9:45 AM	10/7/55 2:30 PM	28:45:00	LPRSA0189562	ABC013582				
10/14/55 10:30 AM	10/25/55 2:00 PM	267:30:00	LPRSA0189561	ABC013581				
10/30/55 11:15 AM	11/1/55 2:45 PM	51:30:00	LPRSA0189560	ABC013580				
11/10/55 5:15 PM	11/12/55 10:00 AM	40:45:00	LPRSA0189559	ABC013579				
11/16/55 10:45 AM	11/18/55 11:00 AM	48:15:00	LPRSA0189558	ABC013578				
1/30/56 2:45 PM	1/31/56 9:45 AM	19:00:00	LPRSA0189556	ABC013576				
2/2/56 1:15 PM	2/3/56 9:45 AM	20:30:00	LPRSA0189555	ABC013575				
2/6/56 5:00 PM	2/7/56 1:45 PM	20:45:00	LPRSA0189554	ABC013574				
2/18/56 9:45 AM	2/19/56 9:15 AM	23:30:00	LPRSA0189553	ABC013573				
3/8/56 3:30 AM	3/9/56 10:15 AM	30:45:00	LPRSA0189552	ABC013572				
3/14/56 10:30 AM	3/15/56 10:15 AM	23:45:00	LPRSA0189551	ABC013571				
3/21/56 6:15 PM	3/23/56 10:30 AM	40:15:00	LPRSA0189549	ABC013569				
4/11/56 3:30 PM	4/12/56 9:40 AM	18:10:00	LPRSA0189545	ABC013565				

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**Exhibit 2-4i. Documented PVSC Bypasses at Jackson Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source	Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
5/2/56 10:30 PM	5/3/56 10:15 AM	11:45:00	LPRSA0189544	ABC013564				
6/2/56 4:20 PM	6/4/56 11:00 AM	42:40:00	LPRSA0189543	ABC013563				
6/27/56 4:00 PM	6/27/56 7:00 PM	3:00:00	LPRSA0189542	ABC013562				
7/16/56 3:30 PM	7/17/56 10:00 AM	18:30:00	LPRSA0189541	ABC013561				
7/21/56 10:45 AM	7/21/56 10:50 PM	12:05:00	LPRSA0189540	ABC013560				
7/27/56 11:30 AM	7/28/56 9:05 AM	21:35:00	LPRSA0189539	ABC013559				
8/6/56 5:30 PM	8/7/56 9:15 AM	15:45:00	LPRSA0189538	ABC013558				
8/21/56 5:45 AM	8/22/56 9:00 AM	27:15:00	LPRSA0189537	ABC013557				
9/6/56 7:30 PM	9/7/56 10:00 AM	14:30:00	LPRSA0189536	ABC013556				
9/7/56 11:15 AM	9/8/56 12:00 PM	24:45:00	LPRSA0189535	ABC013555				
9/27/56 5:00 PM	9/28/56 9:15 AM	16:15:00	LPRSA0189534	ABC013554				
10/22/56 11:00 PM	10/23/56 9:30 AM	10:30:00	LPRSA0189533	ABC013553				
10/31/56 12:45 PM	11/4/56 12:45 PM	96:00:00	LPRSA0189532	ABC013552				
11/18/56 3:15 AM	11/18/56 12:00 PM	8:45:00	LPRSA0189531	ABC013551				
11/22/56 1:30 AM	11/22/56 9:00 AM	7:30:00	LPRSA0189530	ABC013550				
12/9/56 4:00 PM	12/10/56 9:30 AM	17:30:00	LPRSA0189529	ABC013549				
12/14/56 9:15 AM	12/17/56 8:45 AM	71:30:00	LPRSA0189528	ABC013548				
12/22/56 11:10 PM	12/23/56 11:00 AM	11:50:00	LPRSA0189527	ABC013547				
1/23/57 4:45 AM	1/23/57 3:00 PM	10:15:00	LPRSA0189498	ABC013518				
2/9/57 3:00 PM	2/10/57 9:45 AM	18:45:00	LPRSA0189497	ABC013517				
2/26/57 4:45 PM	2/27/57 1:45 PM	21:00:00	LPRSA0189496	ABC013516				
3/1/57 5:30 PM	3/2/57 11:30 PM	30:00:00	LPRSA0189524	ABC013544				
3/8/57 10:30 AM	3/10/57 10:30 AM	48:00:00	LPRSA0189523	ABC013543				
3/19/57 10:30 PM	3/21/57 9:45 AM	35:15:00	LPRSA0189521	ABC013541				
4/2/57 8:45 AM	4/2/57 3:00 PM	6:15:00	LPRSA0189520	ABC013540				
4/9/57 10:15 AM	4/9/57 5:00 PM	6:45:00	LPRSA0189516	ABC013536				
4/10/57 10:15 AM	4/10/57 5:00 PM	6:45:00	LPRSA0189515	ABC013535				
4/11/57 9:30 AM	4/11/57 5:00 PM	7:30:00	LPRSA0189514	ABC013534				
4/12/57 9:30 AM	4/12/57 5:15 PM	7:45:00	LPRSA0189513	ABC013533				
4/23/57 8:00 AM	4/23/57 3:00 PM	7:00:00	LPRSA0189511	ABC013531				
5/14/57 10:00 PM	5/15/57 11:45 AM	13:45:00	LPRSA0189508	ABC013528				
* 5/16/57 12:00 AM	8/25/57 11:59 PM							
* 9/18/57 12:00 AM	12/19/57 11:59 PM							
10/23/58 3:00 AM	10/24/58 10:15 AM	31:15:00	LPRSA0189469	ABC013489				
11/28/58 9:30 PM	11/29/58 11:30 AM	14:00:00	LPRSA0189466	ABC013486				
3/6/59 8:45 AM	3/7/59 10:00 AM	25:15:00	LPRSA0189458	ABC013478				
6/2/59 7:15 PM	6/3/59 9:00 AM	13:45:00	LPRSA0189454	ABC013474				
8/5/59 11:45 AM	8/5/59 3:30 PM	3:45:00	LPRSA0189448	ABC013468				
8/9/59 6:00 AM	8/9/59 7:10 AM	1:10:00	LPRSA0189447	ABC013467				
9/1/59 8:00 PM	9/3/59 9:45 AM	37:45:00	LPRSA0189445	ABC013465				
12/7/59 1:45 AM	12/7/59 9:15 AM	7:30:00	LPRSA0189431	ABC013451				
2/26/60 3:15 AM	2/26/60 11:30 AM	8:15:00	LPRSA0189420	ABC013440				
7/14/60 2:45 PM	7/15/60 9:15 AM	18:30:00	LPRSA0189404	ABC013424				
7/30/60 10:40 AM	7/31/60 10:00 AM	23:20:00	LPRSA0189402	ABC013422				
8/19/60 10:10 AM	8/20/60 10:15 AM	24:05:00	LPRSA0189399	ABC013419				
9/12/60 9:20 AM	9/13/60 11:15 AM	25:55:00	LPRSA0189397	ABC013417				
12/21/60 10:50 AM	12/22/60 10:40 AM	23:50:00	LPRSA0189391	ABC013411				
3/14/61 9:45 AM	3/14/61 2:00 PM	4:15:00	LPRSA0189382	ABC013402				
3/23/61 2:40 PM	3/24/61 11:50 AM	21:10:00	LPRSA0189383	ABC013403				
4/25/61 8:15 PM	4/26/61 9:00 AM	12:45:00	LPRSA0189369	ABC013389				

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**Exhibit 2-4i. Documented PVSC Bypasses at Jackson Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
7/20/61 1:40 PM	7/21/61 10:10 AM	20:30:00	LPRSA0189357	ABC013377				
9/20/61 1:45 PM	9/22/61 10:00 AM	44:15:00	LPRSA0189348	ABC013368				
12/18/61 11:55 AM	12/20/61 9:10 AM	45:15:00	LPRSA0189338	ABC013358				
2/26/62 2:10 PM	2/27/62 9:45 AM	19:35:00	LPRSA0189329	ABC013349				
2/27/62 2:50 PM	3/1/62 9:55 AM	43:05:00	LPRSA0189329	ABC013349				
3/12/62 9:35 AM	3/13/62 3:25 PM	29:50:00	LPRSA0189327	ABC013347				
9/5/62 2:10 PM	9/6/62 9:35 AM	19:25:00	LPRSA0189301	ABC013321				
9/17/62 7:10 PM	9/18/62 1:50 PM	18:40:00	LPRSA0189299	ABC013319				
9/27/62 1:20 PM	9/28/62 2:45 PM	25:25:00	LPRSA0189296	ABC013316				
10/5/62 9:00 AM	10/6/62 10:40 AM	25:40:00	LPRSA0189295	ABC013315				
11/3/62 11:15 AM	11/5/62 10:35 AM	47:20:00	LPRSA0189288	ABC013308				
11/9/62 4:00 PM	11/11/62 11:35 AM	43:35:00	LPRSA0189287	ABC013307				
11/21/62 11:45 PM	11/23/62 10:45 AM	35:00:00	LPRSA0189284	ABC013304				
12/5/62 10:40 AM	12/8/62 10:45 AM	72:05:00	LPRSA0189283	ABC013303				
* 1/1/63 12:00 AM	9/30/74 11:59 PM							

Subtotal

13064:55:00

* Missing data.

Source: PVSC throw-out logs.

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NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

**Exhibit 2-4i. Documented PVSC Bypasses at Jackson Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1974-1975)

	10/16/74 9:00 AM	10/17/74 9:00 PM	36:00:00	LPRSA0195712			
	12/2/74 6:00 AM	12/3/74 9:00 AM	27:00:00	LPRSA0195714			
	12/8/74 2:00 PM	12/9/74 9:00 AM	19:00:00	LPRSA0195714			
	12/16/74 1:00 PM	12/17/74 10:00 AM	21:00:00	LPRSA0195714			
	1/13/75 11:00 AM	1/14/75 9:00 AM	22:00:00	LPRSA0195715			
	1/18/75 2:00 PM	1/19/75 7:00 AM	17:00:00	LPRSA0195715			
	1/29/75 7:00 AM	1/29/75 11:00 AM	4:00:00	LPRSA0195715			
	3/19/75 7:00 PM	3/20/75 9:00 AM	14:00:00	LPRSA0195717			
	4/3/75 10:00 AM	4/4/75 12:00 AM	14:00:00	LPRSA0195718			
*	5/1/75	5/1/75	0:00:00	LPRSA0197119	*	*	
	6/6/75 1:00 AM	6/6/75 9:00 AM	8:00:00	LPRSA0195720			
	6/6/75 4:00 PM	6/7/75 2:00 AM	10:00:00	LPRSA0195720			
	6/12/75 11:00 AM	6/13/75 3:00 PM	28:00:00	LPRSA0195720			
	7/4/75 5:00 AM	7/4/75 1:00 PM	8:00:00	LPRSA0195721			
	7/7/75 9:00 AM	7/7/75 10:00 PM	13:00:00	LPRSA0195721			
	7/9/75 8:00 PM	7/10/75 3:00 AM	7:00:00	LPRSA0195721			
	7/13/75 2:00 PM	7/14/75 9:00 AM	19:00:00	LPRSA0195721			
	7/14/75 12:00 PM	7/17/75 9:00 AM	69:00:00	LPRSA0195721			
	7/25/75 3:00 AM	7/25/75 2:00 PM	11:00:00	LPRSA0195721			
*	9/23/75	9/24/75	0:00:00	LPRSA0197119	*	*	
	9/23/75 3:00 AM	9/28/75 11:00 AM	128:00:00	LPRSA0195722			
*	10/1/75	12/31/04					
Subtotal			475:00:00		16.6	0.535	100
Estimated Mass/Bypass Time (lb/hr)							446
Estimated Bypassed Volume Rate (MG/hr)					0.692		577

* Note: Tide gates were mostly closed and bypasses not measured; overflow data are used to calculate average mass and volume.

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

(2005-2014)

		Elapsed Time (hours)	Frequency of Overflows (#/yr)
	1/1/2005	12/31/2005	400.92
	1/1/2006	12/31/2006	654.23
	1/1/2007	12/31/2007	435.23
	1/1/2008	12/31/2008	588.77
	1/1/2009	12/31/2009	508.30
	1/1/2010	12/31/2010	454.75
	1/1/2011	12/31/2011	647.87
	1/1/2012	12/31/2012	138.54
	1/1/2013	12/31/2013	283.95
	1/1/2014	12/31/2014	283.95
*	1/1/2015	9/30/2016	

Subtotal (2005-2014) **4396.51**

Average annual bypass time (hr) **439.65**

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**Exhibit 2-4i. Documented PVSC Bypasses at Jackson Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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* Missing data.

Source: PVSC, NJPDES permit reports to NJDEP, CSO Regulator Events, 2008-2015.

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**Exhibit 2-4j. Documented PVSC Bypasses at Polk Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1950-1962)

*	8/2/24 12:00 PM	10/3/50 11:59 PM	LPRSA0198629				
	10/4/50 10:00 PM	10/5/50 11:30 AM	13:30:00 LPRSA0188654	ABC012674			
	10/10/50 2:30 AM	10/10/50 1:00 PM	10:30:00 LPRSA0188652	ABC012672			
	10/12/50 1:30 PM	10/13/50 11:00 AM	21:30:00 LPRSA0188650	ABC012670			
	10/23/50 1:30 PM	10/24/50 9:00 AM	19:30:00 LPRSA0188648	ABC012668			
	11/20/50 6:00 PM	11/21/50 9:00 AM	15:00:00 LPRSA0188646	ABC012666			
	11/25/50 9:00 AM	11/25/50 1:00 PM	4:00:00 LPRSA0188643	ABC012663			
	12/4/50 12:30 PM	12/5/50 9:30 AM	21:00:00 LPRSA0188641	ABC012661			
	12/7/50 4:00 PM	12/8/50 11:30 AM	19:30:00 LPRSA0188637	ABC012657			
	12/15/50 10:30 PM	12/16/50 2:30 PM	16:00:00 LPRSA0188639	ABC012659			
	12/29/50 12:30 PM	12/30/50 11:30 AM	23:00:00 LPRSA0188635	ABC012655			
	1/7/51 5:00 PM	1/8/51 9:00 AM	16:00:00 LPRSA0188633	ABC012653			
	1/11/51 5:30 PM	1/12/51 8:30 AM	15:00:00 LPRSA0188621	ABC012641			
	1/14/51 6:00 PM	1/15/51 12:00 PM	18:00:00 LPRSA0188623	ABC012643			
	1/23/51 2:00 AM	1/24/51 2:00 PM	36:00:00 LPRSA0188625	ABC012645			
*	1/25/51 4:00 PM	1/26/51 10:00 AM	18:00:00 LPRSA0188623	ABC012643			
	1/28/51 5:00 PM	1/30/51 10:00 AM	41:00:00 LPRSA0188625	ABC012645			
	1/31/51 4:00 PM	2/2/51 10:00 AM	42:00:00 LPRSA0188628	ABC012648			
	2/10/51 5:30 AM	2/10/51 2:30 PM	9:00:00 LPRSA0188588	ABC012608			
	2/11/51 6:00 PM	2/15/51 2:30 PM	92:30:00 LPRSA0188588	ABC012608			
	2/17/51 4:00 AM	2/18/51 11:30 AM	31:30:00 LPRSA0188588	ABC012608			
	2/19/51 5:00 PM	2/20/51 2:30 PM	21:30:00 LPRSA0188596	ABC012616			
	2/23/51 8:30 AM	2/23/51 10:00 AM	1:30:00 LPRSA0188596	ABC012616			
	3/1/51 1:00 PM	3/2/51 10:00 AM	21:00:00 LPRSA0188604	ABC012624			
	3/3/51 3:00 PM	3/5/51 10:30 AM	43:30:00 LPRSA0188606	ABC012626			
	3/13/51 4:30 PM	3/15/51 9:30 AM	41:00:00 LPRSA0188609	ABC012629			
	3/16/51 4:00 PM	3/19/51 9:30 AM	65:30:00 LPRSA0188612	ABC012632			
	3/19/51 5:00 PM	3/21/51 9:00 AM	40:00:00 LPRSA0188616	ABC012636			
	3/22/51 12:00 AM	12/31/51 11:59 PM					
	2/17/52 3:30 AM	2/19/52 11:00 AM	55:30:00 LPRSA0189755	ABC013775			
	2/20/52 6:00 PM	2/22/52 10:30 AM	40:30:00 LPRSA0189754	ABC013774			
	2/29/52 9:00 PM	3/7/52 10:30 AM	157:30:00 LPRSA0189753	ABC013773			
	3/11/52 5:00 AM	3/18/52 10:30 AM	173:30:00 LPRSA0189752	ABC013772			
	3/19/52 10:30 AM	3/21/52 11:00 AM	48:30:00 LPRSA0189751	ABC013771			
	3/22/52 5:00 PM	3/26/52 11:00 AM	90:00:00 LPRSA0189750	ABC013770			
	4/5/52 8:00 AM	4/7/52 11:00 AM	51:00:00 LPRSA0189749	ABC013769			
	4/14/52 4:00 AM	4/17/52 11:00 AM	79:00:00 LPRSA0189748	ABC013768			
	4/25/52 11:00 AM	5/9/52 4:30 PM	341:30:00 LPRSA0189744	ABC013764			
	5/11/52 10:00 PM	5/14/52 2:30 PM	64:30:00 LPRSA0189743	ABC013763			
	5/18/52 9:15 AM	5/23/52 3:50 PM	126:35:00 LPRSA0189741	ABC013761			
	5/25/52 10:45 AM	5/27/52 2:00 PM	51:15:00 LPRSA0189740	ABC013760			
	5/29/52 5:15 PM	6/14/52 11:00 AM	377:45:00 LPRSA0189736	ABC013756			
	6/17/52 6:45 PM	6/18/52 3:15 PM	20:30:00 LPRSA0189735	ABC013755			
	6/19/52 1:45 PM	6/20/52 8:35 AM	18:50:00 LPRSA0189734	ABC013754			
	6/27/52 5:00 PM	6/28/52 10:00 AM	17:00:00 LPRSA0189729	ABC013749			
	6/29/52 2:50 AM	6/30/52 11:15 AM	32:25:00 LPRSA0189728	ABC013748			
	7/8/52 5:30 PM	7/10/52 3:45 PM	46:15:00 LPRSA0189730	ABC013750			
	7/21/52 5:45 PM	7/22/52 2:00 PM	20:15:00 LPRSA0189725	ABC013745			
	7/31/52 5:40 PM	8/1/52 10:40 AM	17:00:00 LPRSA0189724	ABC013744			
	8/2/52 5:20 PM	8/3/52 10:45 AM	17:25:00 LPRSA0189725	ABC013745			
	8/6/52 4:30 PM	8/11/52 10:30 AM	114:00:00 LPRSA0189715	ABC013735			

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**Exhibit 2-4j. Documented PVSC Bypasses at Polk Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
8/12/52 6:30 PM	8/14/52 10:00 AM	39:30:00	LPRSA0189721	ABC013741				
8/15/52 6:15 PM	8/17/52 10:15 AM	40:00:00	LPRSA0189714	ABC013734				
8/21/52 5:45 PM	8/22/52 2:00 PM	20:15:00	LPRSA0189713	ABC013733				
8/30/52 11:15 AM	9/2/52 10:15 AM	71:00:00	LPRSA0189712	ABC013732				
9/2/52 6:15 PM	9/4/52 10:00 AM	39:45:00	LPRSA0189711	ABC013731				
9/15/52 5:45 PM	9/17/52 6:15 PM	48:30:00	LPRSA0189709	ABC013729				
9/18/52 2:15 PM	9/20/52 10:15 AM	44:00:00	LPRSA0189710	ABC013730				
9/23/52 11:45 AM	9/24/52 10:30 AM	22:45:00	LPRSA0189708	ABC013728				
10/2/52 8:15 PM	10/3/52 2:45 PM	18:30:00	LPRSA0189707	ABC013727				
10/28/52 6:45 PM	10/29/52 10:15 AM	15:30:00	LPRSA0189706	ABC013726				
11/3/52 3:15 PM	11/4/52 10:15 AM	19:00:00	LPRSA0189703	ABC013723				
11/10/52 5:45 PM	11/11/52 10:15 AM	16:30:00	LPRSA0189704	ABC013724				
11/14/52 2:45 PM	12/1/52 2:45 PM	408:00:00	LPRSA0189701	ABC013721				
12/2/52 3:15 PM	12/8/52 10:00 AM	138:45:00	LPRSA0189702	ABC013722				
12/9/52 9:15 AM	1/18/53 3:45 PM	966:30:00	LPRSA0189655	ABC013675				
1/21/53 4:15 PM	1/22/53 2:00 PM	21:45:00	LPRSA0189656	ABC013676				
1/24/53 11:15 AM	1/25/53 11:00 AM	23:45:00	LPRSA0189657	ABC013677				
2/11/53 6:30 PM	2/13/53 11:30 AM	41:00:00	LPRSA0189658	ABC013678				
2/15/53 12:15 PM	2/16/53 3:00 PM	26:45:00	LPRSA0189659	ABC013679				
2/25/53 10:15 AM	3/11/53 10:30 AM	336:15:00	LPRSA0189661	ABC013681				
*	3/14/53 1:30 PM		LPRSA0189672	ABC013692				
	3/17/53 3:45 PM	1027:45:00	LPRSA0189672	ABC013692				
	4/30/53 6:15 PM	190:15:00	LPRSA0189672	ABC013692				
*	5/8/53 10:45 AM		LPRSA0189672	ABC013692				
	6/13/53 6:30 PM	41:15:00	LPRSA0189674	ABC013694				
	6/22/53 11:30 AM	244:00:00	LPRSA0189677	ABC013697				
	7/6/53 9:30 PM	12:30:00	LPRSA0189681	ABC013701				
	7/20/53 10:30 PM	11:45:00	LPRSA0189682	ABC013702				
	7/21/53 5:30 PM	16:15:00	LPRSA0189683	ABC013703				
	7/23/53 9:45 AM	28:15:00	LPRSA0189684	ABC013704				
	8/14/53 2:45 PM	19:15:00	LPRSA0189686	ABC013706				
	10/20/53 9:45 AM	224:15:00	LPRSA0189690	ABC013710				
	11/7/53 8:45 AM	27:30:00	LPRSA0189695	ABC013715				
*	11/16/53 11:15 AM		LPRSA0189653	ABC013673				
	11/23/53 11:30 AM	3:15:00	LPRSA0189698	ABC013718				
	11/25/53 1:45 PM	20:45:00	LPRSA0189652	ABC013672				
	11/30/53 11:30 AM	117:45:00	LPRSA0189651	ABC013671				
	12/6/53 11:00 AM	47:30:00	LPRSA0189650	ABC013670				
	12/9/53 6:00 PM	40:30:00	LPRSA0189649	ABC013669				
	12/14/53 7:45 AM	30:30:00	LPRSA0189647	ABC013667				
1/15/54 2:30 PM	1/18/54 11:15 AM	68:45:00	LPRSA0189592	ABC013612				
1/20/54 3:30 PM	1/22/54 2:00 PM	46:30:00	LPRSA0189591	ABC013611				
1/25/54 4:30 AM	2/2/54 2:30 PM	202:00:00	LPRSA0189590	ABC013610				
2/3/54 3:00 PM	2/4/54 11:00 AM	20:00:00	LPRSA0189589	ABC013609				
2/15/54 3:30 PM	2/19/54 2:45 PM	95:15:00	LPRSA0189587	ABC013607				
2/21/54 6:45 PM	2/22/54 10:15 AM	15:30:00	LPRSA0189586	ABC013606				
2/23/54 1:30 PM	2/27/54 10:15 AM	92:45:00	LPRSA0189621	ABC013641				
3/1/54 12:30 PM	3/5/54 3:15 PM	98:45:00	LPRSA0189619	ABC013639				
3/13/54 4:30 PM	3/15/54 11:00 AM	42:30:00	LPRSA0189618	ABC013638				
3/19/54 6:00 PM	3/20/54 1:10 PM	19:10:00	LPRSA0189617	ABC013637				
3/25/54 11:30 AM	3/26/54 11:15 AM	23:45:00	LPRSA0189616	ABC013636				
4/8/54 3:15 PM	4/9/54 11:00 AM	19:45:00	LPRSA0189613	ABC013633				
4/13/54 2:00 PM	4/13/54 2:40 PM	0:40:00	LPRSA0189623	ABC013643				

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**Exhibit 2-4j. Documented PVSC Bypasses at Polk Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
4/16/54 2:10 PM	4/18/54 11:10 AM	45:00:00	LPRSA0189632	ABC013652				
4/19/54 5:15 PM	4/21/54 3:00 PM	45:45:00	LPRSA0189615	ABC013635				
4/23/54 3:00 PM	4/25/54 11:00 AM	44:00:00	LPRSA0189614	ABC013634				
4/28/54 4:45 PM	4/29/54 11:00 AM	18:15:00	LPRSA0189612	ABC013632				
5/3/54 12:15 PM	5/26/54 10:15 AM	550:00:00	LPRSA0189631	ABC013651				
6/1/54 1:15 PM	6/9/54 11:30 AM	190:15:00	LPRSA0189630	ABC013650				
6/10/54 2:15 PM	6/11/54 10:30 AM	20:15:00	LPRSA0189629	ABC013649				
7/2/54 10:30 AM	7/2/54 5:30 PM	7:00:00	LPRSA0189626	ABC013646				
7/4/54 1:45 PM	7/5/54 10:15 AM	20:30:00	LPRSA0189625	ABC013645				
7/7/54 6:00 PM	7/8/54 2:15 PM	20:15:00	LPRSA0189624	ABC013644				
7/14/54 5:45 PM	7/15/54 1:15 PM	19:30:00	LPRSA0189634	ABC013654				
7/22/54 4:45 PM	7/23/54 10:15 AM	17:30:00	LPRSA0189633	ABC013653				
8/3/54 10:45 AM	8/4/54 10:45 AM	24:00:00	LPRSA0189620	ABC013640				
8/9/54 10:30 AM	8/11/54 11:00 AM	48:30:00	LPRSA0189622	ABC013642				
8/19/54 12:15 AM	8/20/54 11:30 AM	35:15:00	LPRSA0189611	ABC013631				
8/20/54 8:00 PM	8/22/54 10:00 AM	38:00:00	LPRSA0189610	ABC013630				
8/25/54 6:15 PM	8/26/54 2:15 PM	20:00:00	LPRSA0189609	ABC013629				
9/8/54 4:00 PM	9/9/54 2:15 PM	22:15:00	LPRSA0189607	ABC013627				
9/10/54 3:15 PM	9/12/54 11:00 AM	43:45:00	LPRSA0189606	ABC013626				
10/7/54 10:30 AM	10/8/54 2:45 PM	28:15:00	LPRSA0189604	ABC013624				
10/15/54 12:45 PM	10/16/54 8:15 AM	19:30:00	LPRSA0189603	ABC013623				
10/27/54 6:00 PM	10/28/54 2:15 AM	8:15:00	LPRSA0189602	ABC013622				
10/29/54 11:00 AM	10/30/54 10:30 AM	23:30:00	LPRSA0189601	ABC013621				
11/2/54 2:30 PM	11/5/54 3:30 PM	73:00:00	LPRSA0189600	ABC013620				
11/8/54 2:45 PM	11/9/54 2:45 PM	24:00:00	LPRSA0189599	ABC013619				
11/15/54 11:15 AM	12/2/54 4:00 AM	400:45:00	LPRSA0189597	ABC013617				
12/9/54 3:30 PM	12/10/54 2:45 PM	23:15:00	LPRSA0189596	ABC013616				
12/14/54 11:00 AM	12/15/54 2:30 PM	27:30:00	LPRSA0189595	ABC013615				
12/18/54 11:45 AM	12/19/54 9:45 AM	22:00:00	LPRSA0189593	ABC013613				
12/29/54 2:30 PM	12/30/54 1:15 PM	22:45:00	LPRSA0189585	ABC013605				
1/6/55 3:30 PM	1/7/55 10:45 AM	19:15:00	LPRSA0189582	ABC013602				
1/28/55 11:15 AM	3/9/55 11:15 AM	960:00:00	LPRSA0189580	ABC013600				
4/6/55 3:45 PM	4/7/55 10:00 AM	18:15:00	LPRSA0189575	ABC013595				
4/12/55 4:00 PM	4/15/55 10:30 AM	66:30:00	LPRSA0189574	ABC013594				
5/31/55 3:00 PM	5/31/55 5:15 PM	2:15:00	LPRSA0189572	ABC013592				
6/22/55 12:45 AM	6/22/55 10:00 AM	9:15:00	LPRSA0189571	ABC013591				
8/8/55 1:15 AM	8/8/55 9:45 AM	8:30:00	LPRSA0189570	ABC013590				
8/19/55 1:00 AM	8/20/55 4:45 AM	27:45:00	LPRSA0189567	ABC013587				
8/22/55 11:30 PM	8/24/55 2:15 PM	38:45:00	LPRSA0189566	ABC013586				
9/24/55 8:15 AM	9/26/55 10:00 AM	49:45:00	LPRSA0189563	ABC013583				
10/6/55 10:00 AM	10/7/55 2:45 PM	28:45:00	LPRSA0189562	ABC013582				
10/14/55 10:45 AM	10/25/55 2:15 PM	267:30:00	LPRSA0189561	ABC013581				
10/30/55 11:30 AM	11/1/55 3:00 PM	51:30:00	LPRSA0189560	ABC013580				
11/10/55 5:30 PM	11/12/55 10:15 AM	40:45:00	LPRSA0189559	ABC013579				
11/16/55 11:00 AM	11/18/55 11:15 AM	48:15:00	LPRSA0189558	ABC013578				
1/30/56 3:00 PM	1/31/56 10:00 AM	19:00:00	LPRSA0189556	ABC013576				
2/2/56 1:30 PM	2/3/56 10:00 AM	20:30:00	LPRSA0189555	ABC013575				
2/6/56 5:15 PM	2/7/56 2:00 PM	20:45:00	LPRSA0189554	ABC013574				
2/18/56 10:00 AM	2/19/56 9:30 AM	23:30:00	LPRSA0189553	ABC013573				
3/8/56 3:15 AM	3/9/56 10:00 AM	30:45:00	LPRSA0189552	ABC013572				
3/14/56 10:15 AM	3/15/56 10:00 AM	23:45:00	LPRSA0189551	ABC013571				
3/21/56 5:45 PM	3/23/56 10:15 AM	40:30:00	LPRSA0189549	ABC013569				
4/11/56 3:15 PM	4/12/56 9:25 AM	18:10:00	LPRSA0189545	ABC013565				

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NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

**Exhibit 2-4j. Documented PVSC Bypasses at Polk Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
5/2/56 10:15 PM	5/3/56 10:00 AM	11:45:00	LPRSA0189544	ABC013564				
6/2/56 4:10 PM	6/4/56 10:45 AM	42:35:00	LPRSA0189543	ABC013563				
6/27/56 3:45 PM	6/27/56 6:50 PM	3:05:00	LPRSA0189542	ABC013562				
7/16/56 3:15 PM	7/17/56 9:45 AM	18:30:00	LPRSA0189541	ABC013561				
7/21/56 10:30 AM	7/21/56 10:35 PM	12:05:00	LPRSA0189540	ABC013560				
7/27/56 11:15 AM	7/28/56 8:50 AM	21:35:00	LPRSA0189539	ABC013559				
8/6/56 5:15 PM	8/7/56 9:00 AM	15:45:00	LPRSA0189538	ABC013558				
8/21/56 5:30 AM	8/22/56 8:50 AM	27:20:00	LPRSA0189537	ABC013557				
9/6/56 7:45 PM	9/7/56 9:15 AM	13:30:00	LPRSA0189536	ABC013556				
9/7/56 11:30 AM	9/8/56 11:45 AM	24:15:00	LPRSA0189535	ABC013555				
9/27/56 4:45 PM	9/28/56 9:00 AM	16:15:00	LPRSA0189534	ABC013554				
10/22/56 11:15 PM	10/23/56 9:45 AM	10:30:00	LPRSA0189533	ABC013553				
10/31/56 12:30 PM	11/4/56 1:00 PM	96:30:00	LPRSA0189532	ABC013552				
11/18/56 3:00 AM	11/18/56 11:45 AM	8:45:00	LPRSA0189531	ABC013551				
11/22/56 1:15 AM	11/22/56 8:45 AM	7:30:00	LPRSA0189530	ABC013550				
12/9/56 3:45 PM	12/10/56 9:15 AM	17:30:00	LPRSA0189529	ABC013549				
12/14/56 9:00 AM	12/17/56 8:30 AM	71:30:00	LPRSA0189528	ABC013548				
12/22/56 11:00 PM	12/23/56 10:45 AM	11:45:00	LPRSA0189527	ABC013547				
1/23/57 4:30 AM	1/23/57 2:45 PM	10:15:00	LPRSA0189498	ABC013518				
2/9/57 2:45 PM	2/10/57 9:30 AM	18:45:00	LPRSA0189497	ABC013517				
2/26/57 4:30 PM	2/27/57 1:30 PM	21:00:00	LPRSA0189496	ABC013516				
3/1/57 5:15 PM	3/2/57 11:15 PM	30:00:00	LPRSA0189524	ABC013544				
3/8/57 10:15 AM	3/10/57 10:20 AM	48:05:00	LPRSA0189523	ABC013543				
3/19/57 10:15 PM	3/21/57 9:30 AM	35:15:00	LPRSA0189521	ABC013541				
4/2/57 8:30 AM	4/2/57 2:45 PM	6:15:00	LPRSA0189520	ABC013540				
4/9/57 10:00 AM	4/9/57 4:45 PM	6:45:00	LPRSA0189516	ABC013536				
4/10/57 10:00 AM	4/10/57 4:45 PM	6:45:00	LPRSA0189515	ABC013535				
4/11/57 9:15 AM	4/11/57 4:45 PM	7:30:00	LPRSA0189514	ABC013534				
4/12/57 9:15 AM	4/12/57 5:00 PM	7:45:00	LPRSA0189513	ABC013533				
4/23/57 7:45 AM	4/23/57 2:45 PM	7:00:00	LPRSA0189511	ABC013531				
5/14/57 9:45 PM	5/15/57 11:30 AM	13:45:00	LPRSA0189508	ABC013528				
* 5/16/57 12:00 AM	8/25/57 11:59 PM							
* 9/18/57 12:00 AM	12/19/57 11:59 PM							
2/28/58 4:15 AM	2/28/58 9:45 AM	5:30:00	LPRSA0189488	ABC013508				
4/28/58 9:30 AM	4/28/58 2:30 PM	5:00:00	LPRSA0189480	ABC013500				
4/29/58 8:15 PM	4/30/58 9:15 AM	13:00:00	LPRSA0189479	ABC013499				
10/23/58 3:15 AM	10/24/58 10:00 AM	30:45:00	LPRSA0189469	ABC013489				
11/28/58 9:15 PM	11/29/58 11:15 AM	14:00:00	LPRSA0189466	ABC013486				
3/6/59 8:30 AM	3/7/59 9:45 AM	25:15:00	LPRSA0189458	ABC013478				
6/2/59 7:00 PM	6/3/59 8:45 AM	13:45:00	LPRSA0189454	ABC013474				
9/1/59 7:50 PM	9/3/59 10:30 AM	38:40:00	LPRSA0189445	ABC013465				
12/7/59 2:00 AM	12/7/59 9:30 AM	7:30:00	LPRSA0189431	ABC013451				
2/19/60 1:20 AM	2/19/60 1:40 PM	12:20:00	LPRSA0189421	ABC013441				
2/26/60 3:00 AM	2/26/60 11:10 AM	8:10:00	LPRSA0189420	ABC013440				
7/14/60 2:30 PM	7/15/60 9:00 AM	18:30:00	LPRSA0189404	ABC013424				
7/30/60 10:50 AM	7/31/60 10:20 AM	23:30:00	LPRSA0189402	ABC013422				
8/19/60 9:50 AM	8/20/60 10:00 AM	24:10:00	LPRSA0189399	ABC013419				
9/12/60 9:00 AM	9/13/60 11:00 AM	26:00:00	LPRSA0189397	ABC013417				
12/21/60 10:30 AM	12/22/60 10:25 AM	23:55:00	LPRSA0189391	ABC013411				
3/14/61 9:30 AM	3/14/61 1:45 PM	4:15:00	LPRSA0189382	ABC013402				

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**Exhibit 2-4j. Documented PVSC Bypasses at Polk Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
3/23/61 2:20 PM	3/24/61 11:35 AM	21:15:00	LPRSA0189383	ABC013403				
4/10/61 12:10 PM	4/11/61 9:20 AM	21:10:00	LPRSA0189376	ABC013396				
4/13/61 11:10 AM	4/14/61 9:30 AM	22:20:00	LPRSA0189375	ABC013395				
4/16/61 2:00 PM	4/17/61 10:15 AM	20:15:00	LPRSA0189373	ABC013393				
4/25/61 8:00 PM	4/26/61 9:20 AM	13:20:00	LPRSA0189369	ABC013389				
7/20/61 1:25 PM	7/21/61 9:55 AM	20:30:00	LPRSA0189357	ABC013377				
9/19/61 3:35 PM	9/22/61 9:45 PM	78:10:00	LPRSA0189348	ABC013368				
12/18/61 11:45 AM	12/20/61 11:00 AM	47:15:00	LPRSA0189338	ABC013358				
2/26/62 1:55 PM	2/27/62 9:30 AM	19:35:00	LPRSA0189329	ABC013349				
2/27/62 2:35 PM	3/1/62 9:45 AM	43:10:00	LPRSA0189329	ABC013349				
3/12/62 9:25 AM	3/13/62 3:45 PM	30:20:00	LPRSA0189327	ABC013347				
9/5/62 2:00 PM	9/6/62 9:25 AM	19:25:00	LPRSA0189301	ABC013321				
9/27/62 1:05 PM	9/28/62 2:30 PM	25:25:00	LPRSA0189296	ABC013316				
10/5/62 8:45 AM	10/6/62 10:25 AM	25:40:00	LPRSA0189295	ABC013315				
11/3/62 11:10 AM	11/5/62 10:20 AM	47:10:00	LPRSA0189288	ABC013308				
11/9/62 3:50 PM	11/11/62 11:25 AM	43:35:00	LPRSA0189287	ABC013307				
11/21/62 11:30 PM	11/23/62 10:30 AM	35:00:00	LPRSA0189284	ABC013304				
12/5/62 10:35 AM	12/8/62 10:30 AM	71:55:00	LPRSA0189283	ABC013303				
* 1/1/63 12:00 AM	9/30/74 11:59 PM							

Subtotal

13170:00:00

* Missing data.

Source: PVSC throw-out logs.

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**Exhibit 2-4j. Documented PVSC Bypasses at Polk Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1974-1975)

10/16/74 10:00 AM	10/17/74 10:00 PM	36:00:00	LPRSA0195712				
12/2/74 6:00 AM	12/3/74 9:00 AM	27:00:00	LPRSA0195714				
12/8/74 2:00 PM	12/9/74 9:00 AM	19:00:00	LPRSA0195714				
12/16/74 1:00 PM	12/17/74 9:00 AM	20:00:00	LPRSA0195714				
1/13/75 11:00 AM	1/14/75 9:00 AM	22:00:00	LPRSA0195715				
1/18/75 4:00 PM	1/19/75 7:00 AM	15:00:00	LPRSA0195715				
1/29/75 7:00 AM	1/29/75 11:00 AM	4:00:00	LPRSA0195715				
2/23/75	2/23/75	0:00:00	LPRSA0197152				
3/12/75	3/12/75	3:15:00	LPRSA0197152	*	*		
3/19/75 6:00 PM	3/20/75 9:00 AM	15:00:00	LPRSA0195717				
4/3/75 10:00 AM	4/4/75 12:00 AM	14:00:00	LPRSA0195718				
4/24/75	4/25/75	0:40:00	LPRSA0197152	*	*		
6/6/75 1:00 AM	6/6/75 8:00 AM	7:00:00	LPRSA0195720				
6/6/75 2:00 PM	6/7/75 2:00 AM	12:00:00	LPRSA0195720				
6/12/75 10:00 AM	6/13/75 3:00 PM	29:00:00	LPRSA0195720				
7/4/75 5:00 AM	7/4/75 1:00 PM	8:00:00	LPRSA0195721				
7/7/75 9:00 AM	7/7/75 10:00 PM	13:00:00	LPRSA0195721				
7/9/75 7:00 PM	7/10/75 3:00 AM	8:00:00	LPRSA0195721				
7/13/75 2:00 PM	7/14/75 9:00 AM	19:00:00	LPRSA0195721				
7/14/75 11:00 AM	7/17/75 8:00 AM	69:00:00	LPRSA0195721				
7/25/75 3:00 AM	7/25/75 2:00 PM	11:00:00	LPRSA0195721				
8/6/75	8/7/75	0:00:00	LPRSA0197153				
9/23/75 3:00 AM	9/28/75 11:00 AM	128:00:00	LPRSA0195722				
* 10/1/75	12/31/04						
Subtotal		479:55:00		19.3	1.915	104	1,662
Estimated Mass/Bypass Time (lb/hr)							696
Estimated Bypassed Volume Rate (MG/hr)				0.802			

* Note: Tide gates were mostly closed and bypasses not measured; overflow data are used to calculate average mass and volume.

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

(2005-2014)

		Elapsed Time (hours)	Frequency of Overflows (#/yr)
1/1/2005	12/31/2005	446.72	37
1/1/2006	12/31/2006	556.20	33
1/1/2007	12/31/2007	313.09	25
1/1/2008	12/31/2008	605.36	47
1/1/2009	12/31/2009	507.24	52
1/1/2010	12/31/2010	464.28	39
1/1/2011	12/31/2011	617.55	55
1/1/2012	12/31/2012	184.19	39
1/1/2013	12/31/2013	358.25	38
1/1/2014	12/31/2014	358.25	38
* 1/1/2015	9/30/2016		

Subtotal (2005-2014) 4411.13

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**Exhibit 2-4j. Documented PVSC Bypasses at Polk Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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Average annual bypass time (hr)**441.11**

* Missing data.

Source: PVSC, NJPDES permit reports to NJDEP, CSO Regulator Events, 2008-2015.

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**Exhibit 2-4k. Documented PVSC Bypasses at Freeman Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1950-1962)

*	8/2/24 12:00 PM	10/3/50 11:59 PM	LPRSA0198629				
	10/4/50 10:00 PM	10/5/50 11:30 AM	13:30:00 LPRSA0188654	ABC012674			
	10/10/50 2:30 AM	10/10/50 1:00 PM	10:30:00 LPRSA0188652	ABC012672			
	10/12/50 1:30 PM	10/13/50 11:00 AM	21:30:00 LPRSA0188650	ABC012670			
	10/23/50 1:30 PM	10/24/50 9:00 AM	19:30:00 LPRSA0188648	ABC012668			
	11/20/50 6:00 PM	11/21/50 9:00 AM	15:00:00 LPRSA0188646	ABC012666			
	11/25/50 9:00 AM	11/25/50 1:00 PM	4:00:00 LPRSA0188643	ABC012663			
	12/4/50 12:30 PM	12/5/50 9:30 AM	21:00:00 LPRSA0188641	ABC012661			
	12/7/50 4:00 PM	12/8/50 11:30 AM	19:30:00 LPRSA0188637	ABC012657			
	12/15/50 10:30 PM	12/16/50 2:30 PM	16:00:00 LPRSA0188639	ABC012659			
	12/29/50 12:30 PM	12/30/50 11:30 AM	23:00:00 LPRSA0188635	ABC012655			
	1/7/51 5:00 PM	1/8/51 9:00 AM	16:00:00 LPRSA0188633	ABC012653			
	1/11/51 5:30 PM	1/12/51 8:30 AM	15:00:00 LPRSA0188619	ABC012639			
	1/14/51 6:00 PM	1/15/51 12:00 PM	18:00:00 LPRSA0188631	ABC012651			
	1/23/51 2:00 AM	1/24/51 2:00 PM	36:00:00 LPRSA0188621	ABC012641			
*	1/25/51 4:00 PM	1/26/51 10:00 AM	18:00:00 LPRSA0188623	ABC012643			
	1/28/51 5:00 PM	1/30/51 10:00 AM	41:00:00 LPRSA0188625	ABC012645			
	1/31/51 4:00 PM	2/2/51 10:00 AM	42:00:00 LPRSA0188628	ABC012648			
	2/10/51 5:30 AM	2/10/51 2:30 PM	9:00:00 LPRSA0188588	ABC012608			
	2/11/51 6:00 PM	2/15/51 2:30 PM	92:30:00 LPRSA0188588	ABC012608			
	2/17/51 4:00 AM	2/18/51 11:30 AM	31:30:00 LPRSA0188588	ABC012608			
	2/19/51 5:00 PM	2/20/51 2:30 PM	21:30:00 LPRSA0188596	ABC012616			
	2/23/51 8:30 AM	2/23/51 10:00 AM	1:30:00 LPRSA0188596	ABC012616			
	3/1/51 1:00 PM	3/2/51 10:00 AM	21:00:00 LPRSA0188604	ABC012624			
	3/3/51 3:00 PM	3/5/51 10:30 AM	43:30:00 LPRSA0188606	ABC012626			
	3/13/51 4:30 PM	3/15/51 9:30 AM	41:00:00 LPRSA0188609	ABC012629			
	3/16/51 4:00 PM	3/19/51 9:30 AM	65:30:00 LPRSA0188612	ABC012632			
	3/19/51 5:00 PM	3/21/51 9:00 AM	40:00:00 LPRSA0188616	ABC012636			
	3/22/51 12:00 AM	12/31/51 11:59 PM					
	2/17/52 3:30 AM	2/19/52 11:00 AM	55:30:00 LPRSA0189755	ABC013775			
	2/20/52 6:00 PM	2/22/52 10:30 AM	40:30:00 LPRSA0189754	ABC013774			
	2/29/52 9:00 PM	3/7/52 10:30 AM	157:30:00 LPRSA0189753	ABC013773			
	3/11/52 5:00 AM	3/18/52 10:30 AM	173:30:00 LPRSA0189752	ABC013772			
	3/19/52 10:30 AM	3/21/52 11:00 AM	48:30:00 LPRSA0189751	ABC013771			
	3/22/52 5:00 PM	3/26/52 11:00 AM	90:00:00 LPRSA0189750	ABC013770			
	4/5/52 8:00 AM	4/7/52 11:00 AM	51:00:00 LPRSA0189749	ABC013769			
	4/14/52 4:00 AM	4/17/52 11:00 AM	79:00:00 LPRSA0189748	ABC013768			
	4/25/52 11:00 AM	5/9/52 4:30 PM	341:30:00 LPRSA0189744	ABC013764			
	5/11/52 10:00 PM	5/14/52 2:30 PM	64:30:00 LPRSA0189743	ABC013763			
	5/18/52 10:00 AM	5/23/52 4:00 PM	126:00:00 LPRSA0189741	ABC013761			
	5/25/52 11:00 AM	5/27/52 2:30 PM	51:30:00 LPRSA0189740	ABC013760			
	5/29/52 5:45 PM	6/14/52 11:15 AM	377:30:00 LPRSA0189736	ABC013756			
	6/17/52 7:00 PM	6/18/52 3:30 PM	20:30:00 LPRSA0189735	ABC013755			
	6/19/52 1:30 PM	6/20/52 8:30 AM	19:00:00 LPRSA0189734	ABC013754			
	6/27/52 5:00 PM	6/28/52 10:00 AM	17:00:00 LPRSA0189729	ABC013749			
	6/29/52 3:30 AM	6/30/52 11:30 AM	32:00:00 LPRSA0189728	ABC013748			
	7/8/52 5:45 PM	7/10/52 3:30 PM	45:45:00 LPRSA0189730	ABC013750			
	7/21/52 6:00 PM	7/22/52 2:30 PM	20:30:00 LPRSA0189725	ABC013745			
	7/31/52 5:45 PM	8/1/52 11:00 AM	17:15:00 LPRSA0189724	ABC013744			
	8/2/52 5:30 PM	8/3/52 11:00 AM	17:30:00 LPRSA0189725	ABC013745			
	8/6/52 4:45 PM	8/11/52 10:45 AM	114:00:00 LPRSA0189715	ABC013735			

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**Exhibit 2-4k. Documented PVSC Bypasses at Freeman Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
8/12/52 6:45 PM	8/14/52 10:15 AM	39:30:00	LPRSA0189721	ABC013741				
8/15/52 6:30 PM	8/17/52 10:30 AM	40:00:00	LPRSA0189714	ABC013734				
8/21/52 6:00 PM	8/22/52 2:30 PM	20:30:00	LPRSA0189713	ABC013733				
8/30/52 11:30 AM	9/2/52 10:30 AM	71:00:00	LPRSA0189712	ABC013732				
9/2/52 6:30 PM	9/4/52 10:15 AM	39:45:00	LPRSA0189711	ABC013731				
9/15/52 6:00 PM	9/17/52 6:30 PM	48:30:00	LPRSA0189709	ABC013729				
9/18/52 2:30 PM	9/20/52 10:30 AM	44:00:00	LPRSA0189710	ABC013730				
9/23/52 12:00 PM	9/24/52 10:45 AM	22:45:00	LPRSA0189708	ABC013728				
10/2/52 8:30 PM	10/3/52 3:00 PM	18:30:00	LPRSA0189707	ABC013727				
10/28/52 7:00 PM	10/29/52 10:30 AM	15:30:00	LPRSA0189706	ABC013726				
11/3/52 3:30 PM	11/4/52 10:30 AM	19:00:00	LPRSA0189703	ABC013723				
11/10/52 6:00 PM	11/11/52 10:30 AM	16:30:00	LPRSA0189704	ABC013724				
11/14/52 3:00 PM	12/1/52 3:00 PM	408:00:00	LPRSA0189701	ABC013721				
12/2/52 3:30 PM	12/8/52 10:15 AM	138:45:00	LPRSA0189702	ABC013722				
12/9/52 9:30 AM	1/18/53 4:00 PM	966:30:00	LPRSA0189655	ABC013675				
1/21/53 4:30 PM	1/22/53 2:15 PM	21:45:00	LPRSA0189656	ABC013676				
1/24/53 11:30 AM	1/25/53 11:30 AM	24:00:00	LPRSA0189657	ABC013677				
2/11/53 6:45 PM	2/13/53 11:45 AM	41:00:00	LPRSA0189658	ABC013678				
2/15/53 12:30 PM	2/16/53 3:15 PM	26:45:00	LPRSA0189659	ABC013679				
2/25/53 10:30 AM	3/11/53 10:45 AM	336:15:00	LPRSA0189661	ABC013681				
*		3/14/53 2:30 PM	LPRSA0189673	ABC013693				
	3/17/53 4:00 PM	4/29/53 11:30 AM	1027:30:00	LPRSA0189673	ABC013693			
	4/30/53 6:45 PM	5/8/53 4:45 PM	190:00:00	LPRSA0189673	ABC013693			
*	5/8/53 11:30 AM		LPRSA0189673	ABC013693				
	6/13/53 6:45 PM	6/15/53 12:00 PM	41:15:00	LPRSA0189674	ABC013694			
	6/22/53 11:45 AM	7/2/53 3:45 PM	244:00:00	LPRSA0189677	ABC013697			
	7/6/53 9:45 PM	7/7/53 10:15 AM	12:30:00	LPRSA0189681	ABC013701			
	7/20/53 10:45 PM	7/21/53 10:30 AM	11:45:00	LPRSA0189682	ABC013702			
	7/21/53 5:50 PM	7/22/53 10:00 AM	16:10:00	LPRSA0189683	ABC013703			
	7/23/53 10:00 AM	7/24/53 2:30 PM	28:30:00	LPRSA0189684	ABC013704			
	8/14/53 3:00 PM	8/15/53 10:15 AM	19:15:00	LPRSA0189686	ABC013706			
	10/20/53 10:00 AM	10/29/53 6:15 PM	224:15:00	LPRSA0189690	ABC013710			
	11/7/53 9:00 AM	11/8/53 12:30 PM	27:30:00	LPRSA0189695	ABC013715			
	11/23/53 11:45 AM	11/23/53 2:30 PM	2:45:00	LPRSA0189698	ABC013718			
	7/20/53 10:45 PM	7/21/53 10:30 AM	11:45:00	LPRSA0189682	ABC013702			
*	11/16/53 11:30 AM		LPRSA0189653	ABC013673				
	11/25/53 2:00 PM	11/26/53 10:45 AM	20:45:00	LPRSA0189652	ABC013672			
	11/30/53 11:45 AM	12/5/53 9:30 AM	117:45:00	LPRSA0189651	ABC013671			
	12/6/53 11:15 AM	12/8/53 10:45 AM	47:30:00	LPRSA0189650	ABC013670			
	12/9/53 6:15 PM	12/11/53 10:45 AM	40:30:00	LPRSA0189649	ABC013669			
	12/14/53 8:00 AM	12/15/53 2:30 PM	30:30:00	LPRSA0189647	ABC013667			
1/15/54 2:45 PM	1/18/54 11:30 AM	68:45:00	LPRSA0189592	ABC013612				
1/20/54 3:45 PM	1/22/54 2:15 PM	46:30:00	LPRSA0189591	ABC013611				
1/25/54 4:45 AM	2/2/54 2:45 PM	202:00:00	LPRSA0189590	ABC013610				
2/3/54 3:15 PM	2/4/54 11:15 AM	20:00:00	LPRSA0189589	ABC013609				
2/15/54 4:00 PM	2/19/54 3:00 PM	95:00:00	LPRSA0189587	ABC013607				
2/21/54 7:00 PM	2/22/54 10:30 AM	15:30:00	LPRSA0189586	ABC013606				
2/23/54 2:00 PM	2/27/54 10:30 AM	92:30:00	LPRSA0189621	ABC013641				
3/1/54 12:45 PM	3/5/54 3:30 PM	98:45:00	LPRSA0189619	ABC013639				
3/13/54 4:45 PM	3/15/54 11:15 AM	42:30:00	LPRSA0189618	ABC013638				
3/19/54 6:15 PM	3/20/54 12:55 PM	18:40:00	LPRSA0189617	ABC013637				
3/25/54 11:45 AM	3/26/54 11:30 AM	23:45:00	LPRSA0189616	ABC013636				
4/8/54 3:30 PM	4/9/54 11:15 AM	19:45:00	LPRSA0189613	ABC013633				

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NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING

**Exhibit 2-4k. Documented PVSC Bypasses at Freeman Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source	Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
4/13/54 2:15 PM	4/13/54 2:30 PM	0:15:00	LPRSA0189623	ABC013643				
4/16/54 2:20 PM	4/18/54 11:20 AM	45:00:00	LPRSA0189632	ABC013652				
4/19/54 5:30 PM	4/21/54 2:45 PM	45:15:00	LPRSA0189615	ABC013635				
4/23/54 3:15 PM	4/25/54 11:15 AM	44:00:00	LPRSA0189614	ABC013634				
4/28/54 5:00 PM	4/29/54 11:15 AM	18:15:00	LPRSA0189612	ABC013632				
5/3/54 12:30 PM	5/26/54 10:30 AM	550:00:00	LPRSA0189631	ABC013651				
6/1/54 1:30 PM	6/9/54 11:45 AM	190:15:00	LPRSA0189630	ABC013650				
6/10/54 2:00 PM	6/11/54 10:45 AM	20:45:00	LPRSA0189629	ABC013649				
7/2/54 10:45 AM	7/2/54 5:45 PM	7:00:00	LPRSA0189626	ABC013646				
7/4/54 2:00 PM	7/5/54 10:30 AM	20:30:00	LPRSA0189625	ABC013645				
7/7/54 6:15 PM	7/8/54 2:30 PM	20:15:00	LPRSA0189624	ABC013644				
7/14/54 6:00 PM	7/15/54 1:30 PM	19:30:00	LPRSA0189634	ABC013654				
7/22/54 5:00 PM	7/23/54 10:30 AM	17:30:00	LPRSA0189633	ABC013653				
8/3/54 11:00 AM	8/4/54 11:00 AM	24:00:00	LPRSA0189620	ABC013640				
8/9/54 10:45 AM	8/11/54 11:15 AM	48:30:00	LPRSA0189622	ABC013642				
8/19/54 12:30 AM	8/20/54 11:45 AM	35:15:00	LPRSA0189611	ABC013631				
8/20/54 8:15 PM	8/22/54 10:15 AM	38:00:00	LPRSA0189610	ABC013630				
8/25/54 6:30 PM	8/26/54 2:30 PM	20:00:00	LPRSA0189609	ABC013629				
9/8/54 4:15 PM	9/9/54 2:30 PM	22:15:00	LPRSA0189607	ABC013627				
9/10/54 3:30 PM	9/12/54 11:15 AM	43:45:00	LPRSA0189606	ABC013626				
10/7/54 10:45 AM	10/8/54 3:00 PM	28:15:00	LPRSA0189604	ABC013624				
10/15/54 1:00 PM	10/16/54 8:30 AM	19:30:00	LPRSA0189603	ABC013623				
10/27/54 6:15 PM	10/28/54 2:30 AM	8:15:00	LPRSA0189602	ABC013622				
10/29/54 11:15 AM	10/30/54 10:45 AM	23:30:00	LPRSA0189601	ABC013621				
11/2/54 2:45 PM	11/5/54 3:45 PM	73:00:00	LPRSA0189600	ABC013620				
11/8/54 3:00 PM	11/9/54 3:00 PM	24:00:00	LPRSA0189599	ABC013619				
11/15/54 11:30 AM	12/2/54 4:15 AM	400:45:00	LPRSA0189597	ABC013617				
12/9/54 3:45 PM	12/10/54 3:00 PM	23:15:00	LPRSA0189596	ABC013616				
12/14/54 11:15 AM	12/15/54 2:45 PM	27:30:00	LPRSA0189595	ABC013615				
12/18/54 12:00 PM	12/19/54 10:00 AM	22:00:00	LPRSA0189593	ABC013613				
12/29/54 2:45 PM	12/30/54 1:00 PM	22:15:00	LPRSA0189585	ABC013605				
1/6/55 3:45 PM	1/7/55 11:00 AM	19:15:00	LPRSA0189582	ABC013602				
1/28/55 11:30 AM	3/9/55 11:30 AM	960:00:00	LPRSA0189580	ABC013600				
4/6/55 4:00 PM	4/7/55 10:15 AM	18:15:00	LPRSA0189575	ABC013595				
4/12/55 4:15 PM	4/15/55 10:45 AM	66:30:00	LPRSA0189574	ABC013594				
5/31/55 3:15 PM	5/31/55 5:30 PM	2:15:00	LPRSA0189572	ABC013592				
6/22/55 1:00 AM	6/22/55 10:15 AM	9:15:00	LPRSA0189571	ABC013591				
8/8/55 1:00 AM	8/8/55 10:00 AM	9:00:00	LPRSA0189570	ABC013590				
8/19/55 1:15 AM	8/20/55 11:00 AM	33:45:00	LPRSA0189567	ABC013587				
8/22/55 11:45 PM	8/24/55 2:30 PM	38:45:00	LPRSA0189566	ABC013586				
9/24/55 8:30 AM	9/26/55 10:15 AM	49:45:00	LPRSA0189563	ABC013583				
10/6/55 10:15 AM	10/7/55 3:00 PM	28:45:00	LPRSA0189562	ABC013582				
10/14/55 11:00 AM	10/25/55 2:30 PM	267:30:00	LPRSA0189561	ABC013581				
10/30/55 11:45 AM	11/1/55 3:15 PM	51:30:00	LPRSA0189560	ABC013580				
11/10/55 5:45 PM	11/12/55 10:30 AM	40:45:00	LPRSA0189559	ABC013579				
11/16/55 11:15 AM	11/18/55 11:30 AM	48:15:00	LPRSA0189558	ABC013578				
1/30/56 3:15 PM	1/31/56 10:15 AM	19:00:00	LPRSA0189556	ABC013576				
2/2/56 1:45 PM	2/3/56 10:15 AM	20:30:00	LPRSA0189555	ABC013575				
2/6/56 5:30 PM	2/7/56 2:15 PM	20:45:00	LPRSA0189554	ABC013574				
2/18/56 10:15 AM	2/19/56 9:45 AM	23:30:00	LPRSA0189553	ABC013573				
3/8/56 3:00 AM	3/9/56 9:45 AM	30:45:00	LPRSA0189552	ABC013572				
3/14/56 10:00 AM	3/15/56 9:45 AM	23:45:00	LPRSA0189551	ABC013571				
3/21/56 5:30 PM	3/23/56 10:00 AM	40:30:00	LPRSA0189549	ABC013569				

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**Exhibit 2-4k. Documented PVSC Bypasses at Freeman Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
4/11/56 3:00 PM	4/12/56 9:10 AM	18:10:00	LPRSA0189545	ABC013565				
5/2/56 10:00 PM	5/3/56 9:45 AM	11:45:00	LPRSA0189544	ABC013564				
6/2/56 3:50 PM	6/4/56 10:30 AM	42:40:00	LPRSA0189543	ABC013563				
6/27/56 3:35 PM	6/27/56 6:45 PM	3:10:00	LPRSA0189542	ABC013562				
7/16/56 3:00 PM	7/17/56 9:30 AM	18:30:00	LPRSA0189541	ABC013561				
7/21/56 10:15 AM	7/21/56 10:20 PM	12:05:00	LPRSA0189540	ABC013560				
7/27/56 11:00 AM	7/28/56 8:35 AM	21:35:00	LPRSA0189539	ABC013559				
8/6/56 5:00 PM	8/7/56 8:45 AM	15:45:00	LPRSA0189538	ABC013558				
8/21/56 5:15 AM	8/22/56 8:35 AM	27:20:00	LPRSA0189537	ABC013557				
9/6/56 8:00 PM	9/7/56 9:30 AM	13:30:00	LPRSA0189536	ABC013556				
9/7/56 11:45 AM	9/8/56 11:30 AM	23:45:00	LPRSA0189535	ABC013555				
9/27/56 4:30 PM	9/28/56 8:45 AM	16:15:00	LPRSA0189534	ABC013554				
10/22/56 11:30 PM	10/23/56 10:00 AM	10:30:00	LPRSA0189533	ABC013553				
10/31/56 12:15 PM	11/4/56 1:15 PM	97:00:00	LPRSA0189532	ABC013552				
11/18/56 2:45 AM	11/18/56 11:30 AM	8:45:00	LPRSA0189531	ABC013551				
11/22/56 1:00 AM	11/22/56 8:30 AM	7:30:00	LPRSA0189530	ABC013550				
12/9/56 3:30 PM	12/10/56 9:00 AM	17:30:00	LPRSA0189529	ABC013549				
12/14/56 8:45 AM	12/17/56 8:15 AM	71:30:00	LPRSA0189528	ABC013548				
12/22/56 10:45 PM	12/23/56 10:30 AM	11:45:00	LPRSA0189527	ABC013547				
1/23/57 4:15 AM	1/23/57 2:30 PM	10:15:00	LPRSA0189498	ABC013518				
2/9/57 2:30 PM	2/10/57 9:15 AM	18:45:00	LPRSA0189497	ABC013517				
2/26/57 4:15 PM	2/27/57 1:15 PM	21:00:00	LPRSA0189496	ABC013516				
3/1/57 5:00 PM	3/2/57 11:00 PM	30:00:00	LPRSA0189524	ABC013544				
3/8/57 10:00 AM	3/10/57 10:10 AM	48:10:00	LPRSA0189523	ABC013543				
3/19/57 10:00 PM	3/21/57 9:15 AM	35:15:00	LPRSA0189521	ABC013541				
4/2/57 8:15 AM	4/2/57 2:30 PM	6:15:00	LPRSA0189520	ABC013540				
4/9/57 9:45 AM	4/9/57 4:30 PM	6:45:00	LPRSA0189516	ABC013536				
4/10/57 9:45 AM	4/10/57 4:30 PM	6:45:00	LPRSA0189515	ABC013535				
4/11/57 9:00 AM	4/11/57 4:30 PM	7:30:00	LPRSA0189514	ABC013534				
4/12/57 9:00 AM	4/12/57 4:45 PM	7:45:00	LPRSA0189513	ABC013533				
4/23/57 7:30 AM	4/23/57 2:30 PM	7:00:00	LPRSA0189511	ABC013531				
5/14/57 9:30 PM	5/15/57 11:15 AM	13:45:00	LPRSA0189508	ABC013528				
* 5/16/57 12:00 AM	8/25/57 11:59 PM							
* 9/18/57 12:00 AM	12/19/57 11:59 PM							
2/28/58 4:00 AM	2/28/58 9:30 AM	5:30:00	LPRSA0189488	ABC013508				
10/23/58 3:30 AM	10/24/58 9:45 AM	30:15:00	LPRSA0189469	ABC013489				
11/28/58 9:00 PM	11/29/58 11:00 AM	14:00:00	LPRSA0189466	ABC013486				
3/6/59 8:15 AM	3/7/59 9:30 AM	25:15:00	LPRSA0189458	ABC013478				
6/2/59 6:45 PM	6/3/59 8:30 AM	13:45:00	LPRSA0189454	ABC013474				
8/5/59 11:30 AM	8/5/59 3:15 PM	3:45:00	LPRSA0189448	ABC013468				
8/9/59 6:15 AM	8/9/59 7:30 AM	1:15:00	LPRSA0189447	ABC013467				
9/1/59 7:30 PM	9/3/59 10:15 AM	38:45:00	LPRSA0189445	ABC013465				
12/7/59 2:15 AM	12/7/59 9:45 AM	7:30:00	LPRSA0189431	ABC013451				
2/26/60 2:30 AM	2/26/60 10:40 AM	8:10:00	LPRSA0189420	ABC013440				
7/14/60 2:20 PM	7/15/60 8:45 AM	18:25:00	LPRSA0189404	ABC013424				
7/30/60 11:00 AM	7/31/60 10:45 AM	23:45:00	LPRSA0189402	ABC013422				
8/19/60 9:30 AM	8/20/60 11:00 AM	25:30:00	LPRSA0189399	ABC013419				
9/12/60 8:40 AM	9/13/60 10:40 AM	26:00:00	LPRSA0189397	ABC013417				
12/21/60 10:15 AM	12/22/60 10:10 AM	23:55:00	LPRSA0189391	ABC013411				
3/14/61 9:15 AM	3/14/61 1:35 PM	4:20:00	LPRSA0189382	ABC013402				

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**Exhibit 2-4k. Documented PVSC Bypasses at Freeman Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source	Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
3/23/61 2:05 PM	3/24/61 11:20 AM	21:15:00	LPRSA0189383	ABC013403				
4/10/61 11:55 AM	4/11/61 9:05 AM	21:10:00	LPRSA0189376	ABC013396				
4/13/61 10:50 AM	4/14/61 9:15 AM	22:25:00	LPRSA0189375	ABC013395				
4/16/61 1:50 PM	4/17/61 9:35 AM	19:45:00	LPRSA0189373	ABC013393				
4/25/61 7:45 PM	4/26/61 9:40 AM	13:55:00	LPRSA0189369	ABC013389				
7/20/61 1:10 PM	7/21/61 9:45 AM	20:35:00	LPRSA0189357	ABC013377				
9/20/61 1:30 PM	9/22/61 9:15 AM	43:45:00	LPRSA0189348	ABC013368				
11/29/61 9:30 AM	12/20/61 10:30 AM	505:00:00	LPRSA0189340	ABC013360				
2/26/62 1:45 PM	2/27/62 9:20 AM	19:35:00	LPRSA0189329	ABC013349				
2/27/62 2:25 PM	3/1/62 9:30 AM	43:05:00	LPRSA0189329	ABC013349				
3/12/62 9:10 AM	3/13/62 4:00 PM	30:50:00	LPRSA0189327	ABC013347				
9/5/62 1:45 PM	9/6/62 9:15 AM	19:30:00	LPRSA0189301	ABC013321				
9/27/62 12:50 PM	9/28/62 2:20 PM	25:30:00	LPRSA0189296	ABC013316				
10/5/62 8:30 AM	10/6/62 10:10 AM	25:40:00	LPRSA0189295	ABC013315				
11/3/62 11:00 AM	11/5/62 10:05 AM	47:05:00	LPRSA0189288	ABC013308				
11/9/62 3:40 PM	11/11/62 11:15 AM	43:35:00	LPRSA0189287	ABC013307				
11/21/62 11:15 PM	11/23/62 10:15 AM	35:00:00	LPRSA0189284	ABC013304				
12/5/62 10:25 AM	12/8/62 10:20 AM	71:55:00	LPRSA0189283	ABC013303				
* 1/1/63 12:00 AM	9/30/74 11:59 PM							

Subtotal

13585:25:00

* Missing data.

Source: PVSC throw-out logs.

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**Exhibit 2-4k. Documented PVSC Bypasses at Freeman Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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(1974-1975)

10/16/74 10:00 AM	10/17/74 9:00 PM	35:00:00	LPRSA0195712				
12/2/74 6:00 AM	12/3/74 9:00 AM	27:00:00	LPRSA0195714				
12/8/74 2:00 PM	12/9/74 9:00 AM	19:00:00	LPRSA0195714				
12/16/74 1:00 PM	12/17/74 9:00 AM	20:00:00	LPRSA0195714				
1/13/75 11:00 AM	1/14/75 9:00 AM	22:00:00	LPRSA0195715				
1/18/75 4:00 PM	1/19/75 6:00 AM	14:00:00	LPRSA0195715				
1/29/75 6:00 AM	1/29/75 11:00 AM	5:00:00	LPRSA0195715				
2/23/75	2/23/75	0:00:00	LPRSA0197189				
3/19/75 6:00 PM	3/20/75 8:00 AM	14:00:00	LPRSA0195717				
4/3/75	4/3/75	6:25:00	LPRSA0197189	*	*		
4/3/75 9:00 AM	4/4/75 12:00 AM	8:35:00	LPRSA0195718				
4/24/75	4/24/75	0:30:00	LPRSA0197189	*	*		
4/25/75	4/26/75	0:00:00	LPRSA0197189				
6/6/75 1:00 AM	6/6/75 8:00 AM	7:00:00	LPRSA0195720				
6/6/75 10:00 AM	6/7/75 1:00 AM	15:00:00	LPRSA0195720				
6/12/75 10:00 AM	6/13/75 2:00 PM	28:00:00	LPRSA0195720				
7/4/75 5:00 AM	7/4/75 1:00 PM	8:00:00	LPRSA0195721				
7/7/75 9:00 AM	7/7/75 10:00 PM	13:00:00	LPRSA0195721				
7/9/75 7:00 PM	7/10/75 3:00 AM	8:00:00	LPRSA0195721				
7/13/75 2:00 PM	7/14/75 9:00 AM	19:00:00	LPRSA0195721				
7/14/75 11:00 AM	7/17/75 8:00 AM	69:00:00	LPRSA0195721				
7/25/75 3:00 AM	7/25/75 2:00 PM	11:00:00	LPRSA0195721				
9/23/75 3:00 AM	9/28/75 11:00 AM	128:00:00	LPRSA0195722				
* 10/1/75	12/31/04						
Subtotal		477:30:00		4.8	1.22	421	4,286
Estimated Mass/Bypass Time (lb/hr)							695
Estimated Bypassed Volume Rate (MG/hr)				0.198			

* Note: Bypasses were not measured; overflow data are used to calculate average mass and volume.

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

(2005-2014)

		Elapsed Time (hours)	Frequency of Overflows (#/yr)
1/1/2005	12/31/2005	249.59	12
1/1/2006	12/31/2006	632.34	48
1/1/2007	12/31/2007	402.22	29
1/1/2008	12/31/2008	409.04	26
1/1/2009	12/31/2009	453.61	46
1/1/2010	12/31/2010	427.08	36
1/1/2011	12/31/2011	645.16	62
1/1/2012	12/31/2012	179.77	39
1/1/2013	12/31/2013	359.22	39
1/1/2014	12/31/2014	359.22	39
* 1/1/2015	9/30/2016		

Subtotal (2005-2014) 4117.25

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**Exhibit 2-4k. Documented PVSC Bypasses at Freeman Street
(Newark)**

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
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Average annual bypass time (hr)**411.73**

* Missing data.

Source: PVSC, NJPDES permit reports to NJDEP, CSO Regulator Events, 2008-2015.

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Exhibit 2-4I. Documented PVSC Bypasses at Yantacaw

(Paterson, Passaic, Clifton, Garfield, and upstream of 3rd River)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
(1950-1962)							
*	8/2/24 12:00 PM	10/3/50 11:59 PM	LPRSA0198629				
	10/5/50 2:00 AM	10/5/50 11:30 AM	9:30:00 LPRSA0188654	ABC012674			
	11/25/50 1:00 PM	11/26/50 9:30 AM	20:30:00 LPRSA0188643	ABC012663			
	12/4/50 8:30 PM	12/5/50 8:30 AM	12:00:00 LPRSA0188641	ABC012661			
	12/8/50 2:00 AM	12/8/50 9:00 AM	7:00:00 LPRSA0188637	ABC012657			
	12/29/50 12:30 PM	12/30/50 11:30 AM	23:00:00 LPRSA0188635	ABC012655			
	1/14/51 9:00 PM	1/15/51 9:00 AM	12:00:00 LPRSA0188631	ABC012651			
	1/23/51 4:00 AM	1/24/51 8:00 AM	36:00:00 LPRSA0188621	ABC012641			
	2/1/51 3:00 PM	2/2/51 8:00 AM	17:00:00 LPRSA0188628	ABC012648			
	2/7/51 11:00 AM	2/8/51 8:30 AM	21:30:00 LPRSA0188585	ABC012605			
	2/17/51 9:30 PM	2/18/51 9:30 AM	12:00:00 LPRSA0188588	ABC012608			
	2/21/51 9:30 AM	2/22/51 9:00 AM	23:30:00 LPRSA0188596	ABC012616			
	3/14/51 11:00 AM	3/14/51 1:30 PM	2:30:00 LPRSA0188609	ABC012629			
	3/20/51 5:30 AM	3/20/51 9:00 AM	3:30:00 LPRSA0188616	ABC012636			
*	3/22/51 12:00 AM	12/31/51 11:59 PM					
	3/11/52 9:30 AM	3/12/52 9:30 AM	24:00:00 LPRSA0189752	ABC013772			
	3/19/52 3:15 PM	3/20/52 9:00 AM	17:45:00 LPRSA0189751	ABC013771			
	4/25/52 6:00 PM	4/26/52 9:00 AM	15:00:00 LPRSA0189744	ABC013764			
	4/28/52 9:30 AM	4/29/52 10:00 AM	24:30:00 LPRSA0189744	ABC013764			
	5/5/52 3:30 PM	5/6/52 2:00 PM	22:30:00 LPRSA0189745	ABC013765			
	5/6/52 8:00 PM	5/7/52 9:00 AM	13:00:00 LPRSA0189745	ABC013765			
	5/11/52 11:30 PM	5/12/52 1:00 PM	13:30:00 LPRSA0189743	ABC013763			
	5/20/52 11:00 AM	5/21/52 9:30 AM	22:30:00 LPRSA0189741	ABC013761			
	5/25/52 11:30 AM	5/26/52 9:30 AM	22:00:00 LPRSA0189740	ABC013760			
	6/1/52 4:00 AM	6/1/52 7:00 AM	3:00:00 LPRSA0189738	ABC013758			
	6/1/52 10:00 AM	6/2/52 9:30 AM	23:30:00 LPRSA0189738	ABC013758			
	6/4/52 9:00 PM	6/5/52 9:00 AM	12:00:00 LPRSA0189736	ABC013756			
	6/9/52 2:30 PM	6/10/52 8:30 AM	18:00:00 LPRSA0189737	ABC013757			
	6/10/52 4:00 PM	6/11/52 8:30 AM	16:30:00 LPRSA0189737	ABC013757			
	6/11/52 4:00 PM	6/12/52 8:30 AM	16:30:00 LPRSA0189737	ABC013757			
	6/12/52 3:00 PM	6/13/52 9:00 AM	18:00:00 LPRSA0189737	ABC013757			
	6/17/52 8:30 PM	6/18/52 8:30 AM	12:00:00 LPRSA0189735	ABC013755			
	6/19/52 12:30 PM	6/20/52 8:15 AM	19:45:00 LPRSA0189734	ABC013754			
	8/6/52 6:30 PM	8/7/52 9:00 AM	14:30:00 LPRSA0189715	ABC013735			
	10/2/52 9:00 PM	10/3/52 8:00 AM	11:00:00 LPRSA0189707	ABC013727			
	11/2/52 8:00 AM	11/2/52 1:00 PM	5:00:00 LPRSA0189705	ABC013725			
	11/15/52 6:00 PM	11/28/52 9:00 AM	303:00:00 LPRSA0189701	ABC013721			
	12/5/52 2:00 PM	12/6/52 8:00 AM	18:00:00 LPRSA0189702	ABC013722			
	1/24/53 2:00 PM	1/25/53 8:00 AM	18:00:00 LPRSA0189657	ABC013677			
	2/15/53 2:00 PM	2/16/53 9:00 AM	19:00:00 LPRSA0189659	ABC013679			
	2/21/53 10:00 AM	2/22/53 8:00 AM	22:00:00 LPRSA0189660	ABC013680			
	2/25/53 1:00 PM	3/10/53 7:30 PM	318:30:00 LPRSA0189661	ABC013681			
	3/13/53 2:30 PM	3/16/53 8:00 AM	65:30:00 LPRSA0189662	ABC013682			
	3/17/53 1:30 PM	3/18/53 9:30 AM	20:00:00 LPRSA0189662	ABC013682			
	3/24/53 12:00 PM	3/25/53 3:30 PM	27:30:00 LPRSA0189662	ABC013682			
	4/7/53 7:15 AM	4/8/53 9:30 AM	26:15:00 LPRSA0189662	ABC013682			
	4/10/53 10:00 AM	4/11/53 10:30 AM	24:30:00 LPRSA0189662	ABC013682			
	4/12/53 9:00 AM	4/13/53 10:00 AM	25:00:00 LPRSA0189662	ABC013682			
	4/16/53 9:00 AM	4/17/53 10:30 AM	25:30:00 LPRSA0189662	ABC013682			
	5/22/53 4:30 PM	5/25/53 8:30 AM	64:00:00 LPRSA0189662	ABC013682			

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Exhibit 2-4I. Documented PVSC Bypasses at Yantacaw

(Paterson, Passaic, Clifton, Garfield, and upstream of 3rd River)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
5/25/53 2:30 PM	5/27/53 9:30 AM	43:00:00	LPRSA0189662	ABC013682				
6/22/53 2:30 PM	6/23/53 8:45 AM	18:15:00	LPRSA0189677	ABC013697				
6/30/53 4:30 PM	6/30/53 6:30 PM	2:00:00	LPRSA0189679	ABC013699				
7/23/53 10:30 AM	7/24/53 8:45 AM	22:15:00	LPRSA0189684	ABC013704				
8/14/53 6:30 PM	8/15/53 11:00 AM	16:30:00	LPRSA0189687	ABC013707				
10/28/53 9:15 AM	10/28/53 1:30 PM	4:15:00	LPRSA0189692	ABC013712				
11/7/53 11:30 AM	11/8/53 9:00 AM	21:30:00	LPRSA0189695	ABC013715				
11/23/53 1:00 PM	11/24/53 9:45 AM	20:45:00	LPRSA0189698	ABC013718				
12/14/53 8:45 AM	12/15/53 9:00 AM	24:15:00	LPRSA0189647	ABC013667				
2/17/54 10:30 AM	2/17/54 4:30 PM	6:00:00	LPRSA0189587	ABC013607				
3/3/54 1:45 PM	3/4/54 9:00 AM	19:15:00	LPRSA0189619	ABC013639				
5/21/54 9:30 AM	5/21/54 5:00 PM	7:30:00	LPRSA0189631	ABC013651				
8/9/54 12:30 PM	8/10/54 8:30 AM	20:00:00	LPRSA0189622	ABC013642				
8/31/54 1:30 AM	8/31/54 3:30 PM	14:00:00	LPRSA0189608	ABC013628				
9/11/54 2:45 AM	9/11/54 3:30 PM	12:45:00	LPRSA0189606	ABC013626				
10/15/54 2:30 PM	10/15/54 11:30 PM	9:00:00	LPRSA0189603	ABC013623				
10/29/54 12:45 PM	10/29/54 4:00 PM	3:15:00	LPRSA0189601	ABC013621				
11/2/54 3:00 PM	11/3/54 9:30 AM	18:30:00	LPRSA0189600	ABC013620				
11/20/54 4:00 AM	11/25/54 10:00 AM	126:00:00	LPRSA0189597	ABC013617				
12/9/54 4:30 PM	12/10/54 10:00 AM	17:30:00	LPRSA0189596	ABC013616				
12/14/54 12:45 PM	12/15/54 8:30 AM	19:45:00	LPRSA0189595	ABC013615				
2/2/55 10:00 AM	2/4/55 2:30 PM	52:30:00	LPRSA0189580	ABC013600				
2/6/55 7:05 PM	2/7/55 10:30 AM	15:25:00	LPRSA0189580	ABC013600				
2/11/55 3:30 PM	2/12/55 10:00 AM	18:30:00	LPRSA0189580	ABC013600				
2/15/55 5:00 PM	2/16/55 9:45 AM	16:45:00	LPRSA0189580	ABC013600				
2/16/55 6:00 PM	2/17/55 9:45 AM	15:45:00	LPRSA0189580	ABC013600				
2/23/55 10:30 AM	2/23/55 4:45 PM	6:15:00	LPRSA0189579	ABC013599				
3/1/55 1:00 PM	3/1/55 4:30 PM	3:30:00	LPRSA0189579	ABC013599				
3/4/55 3:00 AM	3/4/55 1:45 PM	10:45:00	LPRSA0189579	ABC013599				
3/6/55 4:35 PM	3/7/55 10:30 AM	17:55:00	LPRSA0189579	ABC013599				
3/22/55 10:15 AM	3/23/55 9:45 AM	23:30:00	LPRSA0189577	ABC013597				
8/12/55 4:45 AM	8/12/55 1:15 PM	8:30:00	LPRSA0189569	ABC013589				
8/12/55 2:30 PM	8/13/55 3:15 PM	24:45:00	LPRSA0189569	ABC013589				
8/18/55 11:30 AM	8/19/55 10:30 AM	11:00:00	LPRSA0189567	ABC013587				
10/6/55 11:30 AM	10/6/55 5:00 PM	5:30:00	LPRSA0189562	ABC013582				
10/14/55 3:15 PM	10/15/55 9:00 AM	17:45:00	LPRSA0189561	ABC013581				
10/16/55 4:45 PM	10/17/55 10:30 AM	17:45:00	LPRSA0189561	ABC013581				
10/30/55 12:00 PM	11/1/55 3:30 PM	51:30:00	LPRSA0189560	ABC013580				
11/11/55 12:15 AM	11/11/55 10:00 AM	9:45:00	LPRSA0189559	ABC013579				
11/16/55 11:45 AM	11/17/55 9:30 AM	21:45:00	LPRSA0189558	ABC013578				
2/6/56 9:30 PM	2/7/56 9:00 AM	11:30:00	LPRSA0189554	ABC013574				
2/18/56 11:00 AM	2/18/56 2:20 PM	3:20:00	LPRSA0189553	ABC013573				
3/14/56 11:30 AM	3/14/56 3:00 PM	3:30:00	LPRSA0189551	ABC013571				
9/6/56 8:45 PM	9/6/56 11:00 PM	2:15:00	LPRSA0189536	ABC013556				
10/31/56 3:00 PM	11/1/56 8:30 AM	17:30:00	LPRSA0189532	ABC013552				
12/14/56 1:30 PM	12/15/56 9:45 AM	20:15:00	LPRSA0189528	ABC013548				
2/26/57 7:00 PM	2/27/57 8:30 AM	13:30:00	LPRSA0189496	ABC013516				
3/15/57 10:50 PM	3/16/57 12:00 PM	13:10:00	LPRSA0189522	ABC013542				
5/15/57 11:15 PM	5/16/57 8:55 AM	9:40:00	LPRSA0189508	ABC013528				
5/16/57 12:00 AM	8/25/57 11:59 PM							

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Exhibit 2-4I. Documented PVSC Bypasses at Yantacaw

(Paterson, Passaic, Clifton, Garfield, and upstream of 3rd River)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
* 9/18/57 12:00 AM 12/19/57 11:59 PM							
10/1/58 10:30 AM	10/1/58 5:15 PM	6:45:00	LPRSA0189470 ABC013490				
10/23/58 5:00 AM	10/23/58 1:30 PM	8:30:00	LPRSA0189469 ABC013489				
7/26/59 2:30 AM	7/26/59 10:00 AM	7:30:00	LPRSA0189450 ABC013470				
8/13/59 7:00 PM	8/13/59 10:45 PM	3:45:00	LPRSA0189446 ABC013466				
10/14/59 8:00 PM	10/15/59 12:00 AM	4:00:00	LPRSA0189437 ABC013457				
11/4/59 7:30 PM	11/4/59 11:00 PM	3:30:00	LPRSA0189433 ABC013453				
5/3/61 3:00 PM	5/4/61 12:10 AM	9:10:00	LPRSA0189366 ABC013386				
6/1/61 3:00 PM	6/2/61 9:15 AM	18:15:00	LPRSA0189363 ABC013383				
4/27/62 5:30 PM	4/28/62 5:30 AM	12:00:00	LPRSA0189320 ABC013340				
11/10/62 8:00 AM	11/10/62 9:15 AM	1:15:00	LPRSA0189287 ABC013307				
* 1/1/63 12:00 AM 9/30/74 11:59 PM							

Subtotal**2485:55:00**

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Exhibit 2-4I. Documented PVSC Bypasses at Yantacaw

(Paterson, Passaic, Clifton, Garfield, and upstream of 3rd River)

Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	Avg Overflow Rate (MGD)	Calculated Volume (MG)	Avg TSS - Storm (mg/l)	Mass (lb)
(1975)							
9/25/75	9/27/75	0:00:00	LPRSA0203966	*	*	451	*
Average (per hour)		1:00:00	LPRSA0195596	122.0	5.08	451	19,133
Estimated Mass/Bypass Time (lb/hr)							19,133
Estimated Bypassed Volume Rate (MG/hr)				5.083			

* Note: During this study, the outlet was inactive. Average flows and mass are used in estimates.

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, prepared for PVSC, 1976.

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EXHIBIT 2-5

AVERAGE PVSC SYSTEM FLOW

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Exhibit 2-5. Average PVSC System Flow (MGD)

Average Daily Flow		
Year	(MGD)	Source
1924	86.20	[1]
1925	100.12	[1]
1926	108.55	[1]
1927	126.65	[1]
1928	143.43	[1]
1929	143.75	[1]
1930	148.75	[2]
1931	163.22	[2]
1932	154.10	[2]
1933	166.18	[2]
1934	165.51	[2]
1935	158.17	[2]
1936	164.35	[2]
1937	166.63	[2]
1938	155.94	[2]
1939	159.51	[2]
1940	146.78	[2]
1941	172.48	[2]
1942	175.69	[2]
1943	169.29	[2]
1944	154.02	[2]
1945	180.27	[2]
1946	187.21	[2]
1947	181.66	[2]
1948	193.73	[2]
1949	194.07	[2]
1950	201.02	[3]
1951	185.73	[3]
1952	195.80	[3]
1967	250.00	[4]
1971	252.15	[5]
1972	258.22	[5]
1973	259.62	[5]
1974	244.44	[5]
1975	258.53	[5]
1976	250.50	[5]

Sources:

- [1] PVSC, Exhibit 2: Chart Showing Ave. Daily Sewage Flow - 1924 to 1931, October 11, 1932 [LPRSA0192818].
- [2] Bogert-Childs Engineering Associates, Report on Improving Sedimentation and Dispersal Facilities, prepared for the PVSC, May 1951, Table 3 [MAXUS 2399661; KLL022263].
- [3] PVSC, Average Daily Sewage Flow [LPRSA0192046].
- [4] Interstate Sanitation Commission, Report of the Interstate Sanitation Commission, 1967, p. A-1 [LPRSA0022340].
- [5] PVSC Annual Reports, 1971 -1976 [LPRSA0005524; 5773; 5908; 6065; 6156; 6322].

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EXHIBIT 2-6

HISTORICAL SAMPLING FOR COCs

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Exhibit 2-6. Historical Sampling for Contaminants of Concern (COCs)

			Metals:									PAHs:											
Sample Date	Units	Location	TSS	PCBs	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) Pyrene	Benzo (ghi) Perylene	Benzo (k) Fluoranthene	Chrysene	Dibenzo (a,h) Anthracene	Fluoranthene	Fluorene	Naphthalene	Pyrene
Jul-59	ppm	PVSC Influent	540																				
pre-1992	ppm	PVSC Influent	450																				
post-1992	ppm	PVSC Influent	200																				
1977	ug/l	Bloomington, IN POTW (3.6 MGD)		145																			
		Baltimore, MD POTW (180 MGD)		15																			
	lb/MG	Bloomington, IN POTW (3.6 MGD)		1.21																			
		Baltimore, MD POTW (180 MGD)		0.13																			
1978	lb/day	PVSC Influent (average flow=280 MGD)			98	1523	499	1869	119	991	5694												
	lb/MG	PVSC Influent			0.35	5.44	1.78	6.68	0.43	3.54	20.34												
1986	lb/day	PVSC Influent Treatment Plant (1)										24.9	37.7	60.5	342.8	41.2	490.1	20.5	76.3	146.5	67.3	164.8	42.2
	lb/MG	PVSC Influent Treatment Plant (1)										0.09	0.13	0.22	1.22	0.15	1.75	0.07	0.27	0.52	0.24	0.59	0.15
1999	ng/l	PVSC Influent -High Flow Events (avg)		300																			
	lb/MG	(conversion)		0.003																			

Sources:
PVSC, Monthly Summarized Laboratory Report: Influent and Effluent Newark Bay Treatment Plant, July 1959 [LPRSA0194412].
Hazen and Sawyer, Maximization of the Conveyance of Wastewater: Final Report, prepared for the PVSC, December 1996, p.2.
EPA, PCBs Removal in Publicly-Owned Treatment Works, July 16, 1977, p.2.
PVSC, Heavy Metals Source Determination, Phase II, 1980 (Summarizing Phase I work in 1978) [LPRSA0009923 and 0009955].
CFM Incorporated, Investigation of Organic Priority Pollutants in the Influent to the PVSC Treatment Plant, May 1986, Tables 2-3 (measurements taken 11/84-1/86).

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EXHIBIT 2-7
SUMMARY OF PVSC BYPASSES:
TIME, VOLUME, AND MASS

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Exhibit 2-7a. Summary of Documented PVSC Bypasses: Time, Volume and Mass

Bypass	Documented Time Bypassed 1950-2014 (Hr:Min:Sec)	Estimated Volume (MG)	Estimated Mass Bypassed (lb)	Estimated PCBs Bypassed (lb)	Estimated Mercury Bypassed (lb)	Estimated Copper Bypassed (lb)	Estimated Lead Bypassed (lb)	Estimated PAHs Bypassed (lb)*
Yantacaw	2485:55:00	12,637	47,561,885	1,582	5,371	22,520	84,350	68,365
Union Outlet	14288:39:00	14,466	26,196,613	1,811	6,148	25,780	96,558	78,259
Verona Avenue	12401:16:00	3,623	6,082,315	312	1,275	5,345	20,020	16,226
Herbert Place	17804:22:36	6,897	9,916,585	678	2,586	10,842	40,610	32,914
4th Avenue	18053:00:12	4,956	7,525,970	461	1,810	7,588	28,421	23,035
Clay Street	19127:37:12	45,420	83,212,677	4,312	16,738	70,186	262,880	213,061
Rector Street	18216:25:24	6,485	7,602,427	608	2,375	9,960	37,305	30,235
Saybrook Place	17309:53:00	13,374	29,215,700	1,244	4,881	20,467	76,657	62,130
City Dock	13075:16:00	23,154	40,970,087	1,923	8,020	33,630	125,959	102,088
Jackson Street	17936:25:36	12,406	8,957,558	1,172	4,562	19,129	71,646	58,068
Polk Street	18061:02:48	14,486	10,884,187	1,371	5,330	22,349	83,708	67,844
Freeman Street	18180:10:00	3,598	11,067,181	348	1,339	5,614	21,026	17,041
Total		161,503	289,193,187	15,822	60,432	253,409	949,142	769,267

*Includes a subset of PAHs (see Exhibit 2-6 for listing).

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Exhibit 2-7b. Summary of Estimated Total PVSC Bypasses During 1924-2016: Time, Volume and Mass

Bypass	Estimated Total Time Bypassed 1924-2016 (Hr:Min:Sec)	Estimated Volume (MG)	Estimated Mass Bypassed (lb)	Estimated PCBs Bypassed (lb)	Estimated Mercury Bypassed (lb)	Estimated Copper Bypassed (lb)	Estimated Lead Bypassed (lb)	Estimated PAHs Bypassed (lb)*
Yantacaw	9353:37:26	47,548	178,958,529	5,621	20,208	84,737	317,380	257,232
Union Outlet	53939:46:09	54,608	98,892,427	6,455	23,208	97,319	364,508	295,429
Verona Avenue	48626:11:44	14,208	25,679,962	1,456	5,382	22,567	84,526	68,507
Herbert Place	68520:37:32	26,543	39,984,396	2,284	10,426	43,718	163,744	132,712
4th Avenue	69487:54:29	19,078	30,665,149	1,666	7,373	30,918	115,804	93,858
Clay Street	73006:49:42	173,360	336,192,234	15,669	67,623	283,562	1,062,078	860,800
Rector Street	70164:59:00	24,980	30,961,811	2,194	9,673	40,563	151,930	123,137
Saybrook Place	71465:11:16	55,215	128,569,673	4,935	21,479	90,067	337,345	273,414
City Dock	47656:06:49	84,391	160,207,171	6,331	31,361	131,503	492,544	399,201
Jackson Street	68922:12:27	47,671	36,329,289	4,227	18,501	77,580	290,577	235,509
Polk Street	69409:56:36	55,673	44,139,691	4,934	21,614	90,634	339,469	275,135
Freeman Street	69874:09:42	13,829	44,690,992	1,259	5,406	22,669	84,907	68,816
Total		617,103	1,155,271,324	57,032	242,254	1,015,838	3,804,812	3,083,750

*Includes a subset of PAHs (see Exhibit 2-6 for listing).

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EXHIBIT 2-8

ANCHOR QEA ASSESSMENT OF CSOs

Evaluation of Solids Contributions to the Passaic River from Passaic Valley Sewerage Commission Combined Sewer Overflows

Anchor QEA, LLC
123 Tice Boulevard, Suite 205
Woodcliff Lake, New Jersey 07677

Prepared for
Shook, Hardy & Bacon L.L.P.

1 Objectives

The objective of the work presented here is to evaluate the contribution of solids that the Passaic Valley Sewerage Commission (PVSC) has discharged to the Passaic River via combined sewer overflows (CSOs) and bypasses from its system during wet weather (i.e., rainfall) events. The evaluation uses PVSC flow and solids information from a comprehensive study of its collection system (Killam 1976) to estimate solids loads from the PVSC CSOs to the Passaic River. The data generated during the Killam (1976) study were used to develop an empirical relationship between rainfall and overflow volumes to estimate CSO discharges for years without overflow measurements. Estimates of solids concentrations in the overflows were applied to the overflow volumes to estimate the mass of solids discharged from the PVSC CSOs between Water Year (WY) 1924 and WY2016.

2 Methodology and Data

2.1 Methodology

Between October 1974 and September 1975 (referred to as WY1975), Elson T. Killam Associates, Inc. (Killam) conducted a comprehensive study of the PVSC interceptor and collection system to support an evaluation of alternatives aimed at eliminating overflows to the Passaic River. This study included physical characterization of the PVSC system and its components and measurement of flow and quality of the overflows over a 1-year period (Killam 1976).

This evaluation includes several parts:

1. Flow and solids concentration information collected during the WY1975 study period were used to estimate the total mass of solids (i.e., solids load) that entered the Passaic River during overflow events occurring in this WY.
2. An empirical relationship was established between total rainfall and the total overflow volume discharged from the PVSC CSOs to the Passaic River in order to estimate flow volumes and solids loads from PVSC operations from 1924 to 2016. For the period prior to the Killam study (i.e., WY1924 to WY1974), this relationship was applied to historic precipitation records from WY1924

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to WY1974 to estimate the overflow volume for each year during this period. The average solids concentration measured during the WY1975 study was then applied to these overflow volumes to estimate the mass of solids discharged from the PVSC CSOs to the Passaic River for each year.

3. For the period after the Killam study (i.e., WY1976 to WY2016), the empirical relationship was applied to local precipitation records to estimate the number and magnitude of overflow events that occurred during this period. Then, average solids concentrations from the 1976 Killam study, a 2007 Hatch Mott MacDonald study, and a 2014 Newark stormwater study (Amar et al. 2014) were applied to the estimated overflow volumes to estimate the mass of solids discharged from the PVSC CSOs to the Passaic River for each year.

2.2 Data

Data from several sources were used in this evaluation, including:

- Overflow volumes and solids concentration measurements from the PVSC CSOs to the Passaic River in WY1975 (Killam 1976)
- Precipitation records from the National Oceanic and Atmospheric Administration (NOAA) weather station at Jersey City (1924 to 1948)
- Precipitation records from the NOAA weather station at Newark Liberty International Airport (Newark Airport; 1949 to 2013)
- Precipitation records from the weather station at Newark Airport, as reported by Weather Underground (www.wunderground.com) (2014 to 2016)
- Solids concentration information from the wastewater and CSO outfalls (USFWPCA 1969)
- Solids concentration information from PVSC system (Hatch Mott MacDonald 2007)
- Solids concentration information from Newark stormwater (Amar et al. 2014)

3 PVSC CSO Solids Loads

3.1 WY1975

Between October 1974 and September 1975, Killam conducted a comprehensive study of 73 CSOs (65 active, 8 inactive) within the PVSC collection system (Figure 3-1 and Table 3-1). The study focused on identifying and characterizing each CSO, and understanding the number, magnitude, and quality of observed overflows in response to measured precipitation events. To accomplish the latter objective, rainfall volume and duration were recorded for weather events occurring in the region. Dry and wet weather flow measurements were obtained from each CSO. Due to the large number of CSOs, the monitoring was conducted over variable time frames within the year; thus, no complete annual record of rainfall or overflow exists for any CSO location. In addition to overflow volume, sampling of total suspended solids (TSS), biochemical oxygen demand (BOD), and chemical oxygen demand (COD) was performed for a subset of overflow events to determine the quality of the overflows.

Killam reported that overflows sent approximately 7,600 million gallons (MG) of combined stormwater and sewage to the Passaic River over the monitored 1-year period. Total solids load from the CSOs was not computed in the report. This overflow volume does not include an additional 3,400 MG that were discharged from the South Side Interceptor overflows and diversions from valve closings, bypasses, the Second River Union Outlet sanitary bypass, and other sanitary system overflows (Killam 1976).

For the evaluation, measured rainfall volume, duration, intensity, and overflow volume were analyzed for each CSO location to investigate correlations that would allow one to use rainfall information to estimate overflow volume in other years (i.e., those before and after WY1975). Correlations for individual CSOs were poor due to data paucity; therefore, a system-wide relationship between rainfall and overflow volume was examined. The total daily overflow volume for each precipitation event, as reported by Killam (1976), is plotted against the daily rainfall in Figure 3-2. Reported overflow volume correlated well with daily rainfalls and a linear regression provided a good fit to the data (Figure 3-2).

The relationship shown in Figure 3-2 and precipitation records from Newark Airport for the same 1-year period were used to estimate the total overflow volume from the PVSC CSOs for comparison to that reported by Killam (1976). Because rainfall events of short duration or low intensity did not always generate runoff and overflow events during the Killam study, rainfall events less than 0.1 inch were assumed to generate no overflows and were not included in the overflow volume calculations. Using this empirical relationship and the Newark Airport precipitation records yielded an estimated overflow volume from the PVSC CSOs of 7,000 MG during WY1975. These numbers compare reasonably well with those reported by Killam (1976), providing confidence that the empirical relationship derived from the Killam study provides a reasonable tool to estimate overflow volumes in other years.

To estimate solids concentrations in the overflows, we reviewed the TSS data generated during the Killam study. Similar to the overflow monitoring, water quality monitoring was not conducted for the full year at any one station, and data exist for only a subset of the observed overflows. Additionally, sampling occurred at many CSOs during dry-weather flow to determine solids concentrations of the baseline flows to the PVSC treatment plant. Therefore, to accurately assess TSS concentrations in overflows, TSS reported by Killam (1976) when overflows were not noted were excluded from this analysis. The cumulative frequency distribution of the TSS concentrations measured by Killam is shown in Figure 3-3. Measurements range from approximately 20 milligrams per liter (mg/L) to 400 mg/L. The average TSS concentration of 147 mg/L was assumed to represent the average condition during an overflow event.

The total mass of solids discharged from the PVSC overflows for WY1975 was computed as the product of the reported total overflow volume (7,600 MG) and the average TSS concentration in the

overflow (147 mg/L). The calculations indicate that PVSC overflows delivered, on average, approximately 9.3 million pounds (lbs; 4,700 tons) of solids to the Passaic River during WY1975.

3.2 WY1924 to WY1974

No known regular sampling or flow measurements were conducted on CSO overflows prior to 1976. As such, impacts of infrastructure and usage changes on overflow volumes and TSS since 1924 are not known. To assess historical trends, overflow behavior and TSS levels were assumed to be similar to those observed in 1975, and the empirical overflow volume-rainfall relationship developed from the Killam study data was used to estimate overflow volumes discharged from the PVSC CSOs to the Passaic River for WY1924 to WY1974.

Rainfall data collected by NOAA at the Newark Airport weather station were used in this evaluation to forecast and hindcast overflow volumes and solids loading values from the PVSC CSOs to the Passaic River. Hourly rainfall records at Newark Airport are available for 1949 through 2013. For 2013 through 2016, daily Newark Airport rainfall records were downloaded from Weather Underground. For 1924 to 1948, rainfall data from nearby NOAA Jersey City weather station were used to calculate overflow volumes from 1924 to 1948.

The empirical overflow volume-rainfall relationship (shown in Figure 3-2) was used, along with the Jersey City/Newark Airport precipitation records, to estimate the annual volume of PVSC overflows for WY1924 to WY1974 (Figure 3-4). The average TSS concentration of 147 mg/L from the Killam study data (WY1975) was applied to the estimated overflow volumes to compute the historical solids loads from the PVSC CSOs to the Passaic River. It is likely the solids concentrations in overflows were higher in the decades before the Federal Water Pollution Control Act of 1972 than the levels measured during WY1975. However, without specific data, TSS concentration scaling assumptions could not be made. The annual solids loads estimated for WY1924 to WY1974 are shown in Figure 3-5.

3.3 WY1976 to WY2016

Similar to the WY1924 to WY1974 period, the empirical overflow volume-rainfall relationship (shown in Figure 3-2) was used along with the Newark Airport precipitation records to estimate the annual volume of PVSC overflows for WY1976 to WY2016. The estimated overflows for this period are shown in Figure 3-4.

Since 1975, the municipalities served by the PVSC have continued to develop, industrial dischargers have changed, and several federal and state regulations impacting allowable discharges were enacted (i.e., 1977 Clean Water Act, 1987 Water Quality Act, and 2004 New Jersey Stormwater Management rules). To capture the changing landscape of the PVSC system and the associated reduction in solids concentrations that resulted from best management practices (BMPs) within the

watershed, data collected for the PVSC and City of Newark after 1975 were used to adjust the assumed solids concentrations in overflows for WY1976 to WY2016.

In 2007, Hatch Mott MacDonald conducted a modeling study on behalf of the PVSC. The results of this modeling indicated an average TSS concentration in the PVSC overflows of approximately 90 mg/L. This value was used to represent average TSS conditions for 1988. The reduction in TSS between WY1976 and WY1988 is likely due to responses to the Clean Water and Federal Water Pollution Control acts that regulate discharges and required application of BMP technology to reduce pollutant loads to waterbodies. To reflect these changing conditions in the solids load evaluation, a linear reduction in solids concentration from 147 mg/L in WY1976 to 90 mg/L in WY1988 was assumed (Figure 3-6).

City of Newark stormwater reporting from 2014 indicates that typical stormwater TSS concentrations average 80 mg/L (Amar et al. 2014). The additional reduction in TSS concentration since 1988 is assumed to be an effect of the implementation of 2004 New Jersey Stormwater Management rules. Therefore, for this evaluation, a linear reduction in solids concentration from 90 mg/L in WY2004 to 80 mg/L in WY2014 was applied (Figure 3-6). Water quality reporting data are not currently available for individual CSOs, therefore the average of 80 mg/L was assumed to approximate contemporary TSS concentrations in overflows for WY2014 to WY2016 (Figure 3-6).

Solids loads to the Passaic River between WY1976 to WY2016 were estimated by multiplying the overflow volumes shown in Figure 3-4 and the TSS concentrations shown in Figure 3-6; results of this calculation are shown in Figure 3-5. The estimated solids loads shown in Figure 3-5 do not include the effects of significant storm events such as Hurricane Sandy, which rendered the PVSC plant inoperable for several days in 2012 (Climate Central 2013).

3.4 Summary

Based on this evaluation, the PVSC CSOs are estimated to have delivered 594 million lbs (297,000 tons) over the entire period examined (i.e., WY1924 and WY2016). This is likely an underestimate of the total solids load discharged over this period for the following reasons:

- The average solids concentration (i.e., 147 mg/L) used to represent TSS levels in historical overflows from the PVSC CSOs is likely lower than the levels in discharges occurring earlier than WY1975. This conclusion is supported by the TSS level found in a 1969 CSO study conducted by the U.S. Federal Water Pollution Control Administration (USFWPCA) and the New Jersey State Department of Health, with an average TSS of 238 mg/L from 15 CSOs, ranging from 8 to 1,230 mg/L (USFWPCA 1969).
- The Killam (1976) study identified eight inactive CSOs during their characterization of the PVSC system. These inactive CSOs were historically active and, thus, discharged combined sewage and stormwater during their active life.
- The Newark Bay treatment plant pumping facility was upgraded between 1953 and 1956, and additional upgrades were performed in 1964 (USFWPCA 1969). Overflow occurrence and

discharge volume may have declined as a result of these upgrades, which would indicate that the overflow volumes estimated using the empirical relationship between overflow volume and rainfall developed using the Killam (1976) measurements likely underestimate discharges from the PVSC CSOs prior to these updates.

- The estimated PVSC CSO solids loads do not include the effects of significant storm events such as Hurricane Sandy, which rendered the PVSC plant inoperable for several days in 2012 (Climate Central 2013), discharges due to maintenance or system malfunctions, or other intentional discharges that are not represented in the Killam (1976) study data.

References

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- Killam (Elson T. Killam Associates, Inc.), 1976. *Report Upon Overflow Analysis to Passaic Valley Sewerage Commissioners Passaic River Overflows*.
- USFWPCA (U.S. Federal Water Pollution Control Administration), 1969. *Report on the Quality of the Interstate Waters of the Lower Passaic River and Upper and Lower Bays of New York Harbor*.

Table 3-1**PVSC CSOs Included in the 1976 Killam Report**

Privileged and Confidential
Attorney Work Product
Prepared at Request of Counsel

CSO Location	Discharge Permit Number	City	Status
Garden State Paper Company	009/G-001	Garfield	Inactive
Dundee Island	070/Q-002	Passaic	Active
Lodi Force Main	027/L-001	Passaic	Inactive
Passaic Tail Race	069/Q-001	Passaic	Inactive
Wallington Pump Station	005	Wallington	Inactive
Woodward Avenue	017/R-001	Rutherford	Inactive
Pierrepont Avenue	072/R-002	Rutherford	Active
Rutherford Avenue	073/R-003	Rutherford	Active
Yantacaw Pump Station	004	Clifton	Inactive
Yantacaw Street	003	Clifton	Inactive
North Arlington	006	North Arlington	Inactive
Curtis Place	042/P-001	Paterson	Active
Mulberry Street	043/P-002	Paterson	Active
West Broadway	044/P-003	Paterson	Active
Bank Street	045/P-004	Paterson	Active
Bridge Street	046/P-005	Paterson	Active
Montgomery Street	047/P-006	Paterson	Active
Straight Street	048/P-007	Paterson	Active
Franklin Street	049/P-008	Paterson	Active
Keen Street	050/P-009	Paterson	Active
Warren Street	051/P-010	Paterson	Active
Sixth Avenue	052/P-011	Paterson	Active
East 5th Street and 5th Avenue	053/P-012	Paterson	Active
East 11th Street	054/P-013	Paterson	Active
East 12th Street & Fourth Avenue	055/P-014	Paterson	Active
S.U.M. Park	056/P-015	Paterson	Active
Northwest St	057/P-016	Paterson	Active
Arch Street	058/P-017	Paterson	Active
Jefferson Street	059/P-018	Paterson	Active
Stout Street	069/P-019	Paterson	Active
North Straight Street	061/P-020	Paterson	Active
Bergen Street	062/P-021	Paterson	Active
Short street	063/P-022	Paterson	Active
Second Avenue	064/P-023	Paterson	Active
Third Avenue	065/P-024	Paterson	Active
Tenth Avenue and East 33rd Street	066/P-025	Paterson	Active
Twentieth Avenue	067/P-026	Paterson	Active
Market Street	068/P-027	Paterson	Active
Hudson Street	007	Paterson	Active
Stewart Avenue	017/K-001	Kearny	Active
Washington Avenue	018/K-002	Kearny	Active
Nairne Avenue	020/K-004	Kearny	Active
Marshall Street	021/K-005	Kearny	Active
Johnston Avenue	022/K-006	Kearny	Active
Ivy Street	023/K-007	Kearny	Active
Bergen Avenue	024/K-008	kearny	Active
Bergen Avenue	019/K-003	kearny	Active
Tappan Street	025/K-009	Kearny	Active
Dukes Street	026/K-010	Kearny	Active

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Table 3-1**PVSC CSOs Included in the 1976 Killam Report**

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Attorney Work Product
Prepared at Request of Counsel

CSO Location	Discharge Permit Number	City	Status
Central Avenue	008/E-001	E. Newark	Active
New Street (Hamilton Avenue)	010/H-001	Harrison	Active
Cleveland Avenue	011/H-002	Harrison	Active
Harrison Avenue	012/H-003	Harrison	Active
Dey Street	013/H-004	Harrison	Active
Middlesex Street	014/H-005	Harrison	Active
Bergen Street	015/H-006	Harrison	Active
Worthington Avenue	016/K-004	Harrison	Active
Verona Avenue	028/N-001	Newark	Active
Delavan Avenue	029/N-002	Newark	Active
Herbert Place	030/N-003	Newark	Active
Third Avenue	031/N-004	Newark	Active
Fourth Avenue	032/N-005	Newark	Active
Clay Street	033/N-006	Newark	Active
Orange Street	034/N-007	Newark	Active
Bridge Street	035/N-008	Newark	Active
Rector Street	036/N-009	Newark	Active
Saybrook Place	037/N-010	Newark	Active
City Dock	038/N-011	Newark	Active
Jackson Street	039/N-012	Newark	Active
Polk Street	040/N-013	Newark	Active
Freeman Street	041/N-014	Newark	Active
Passaic Street	033/N-006C	Newark	Active
Union Outlet	---	Newark	Active

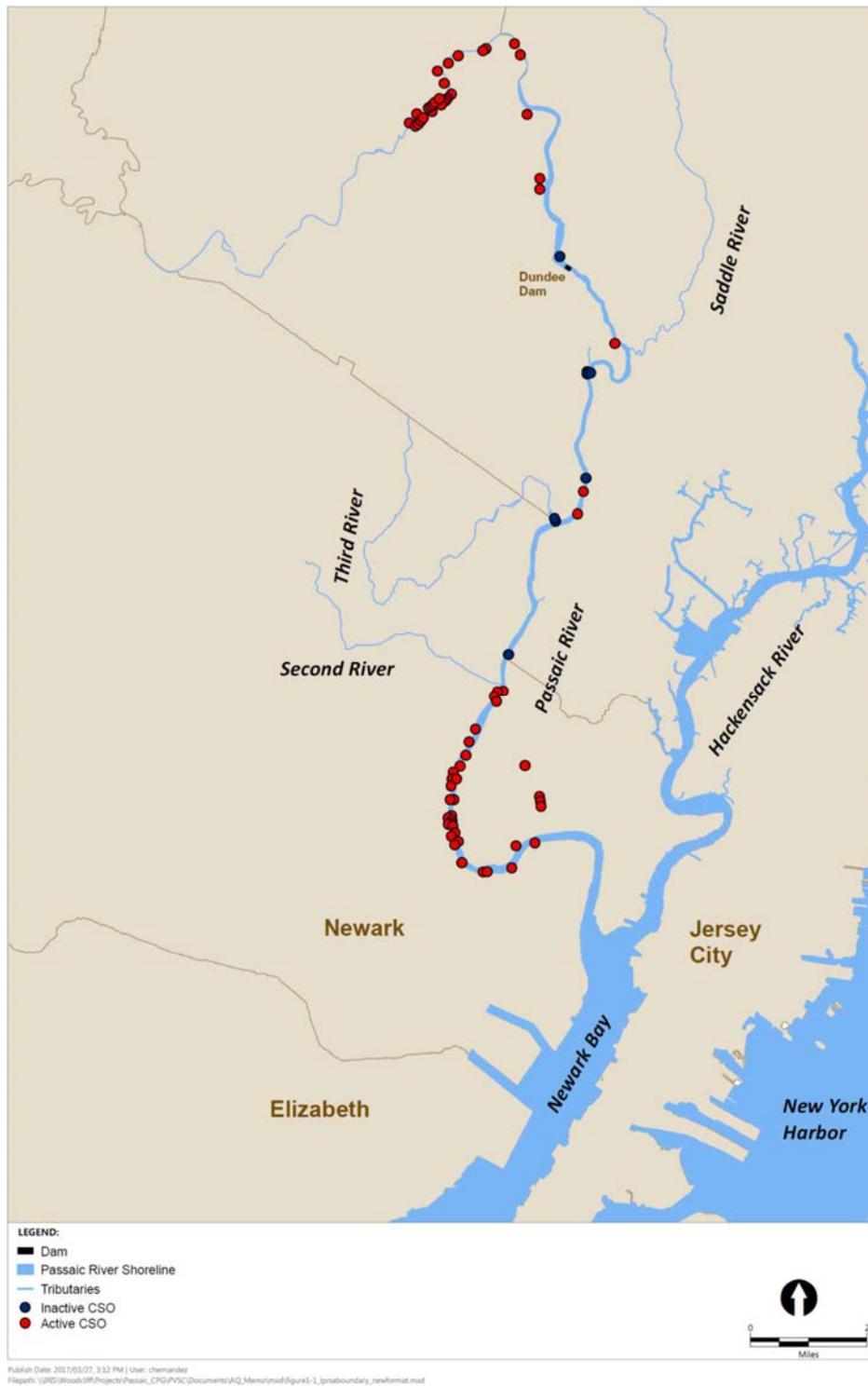
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Figure 3-1
PVSC CSO Locations included in the 1976 Killam Report

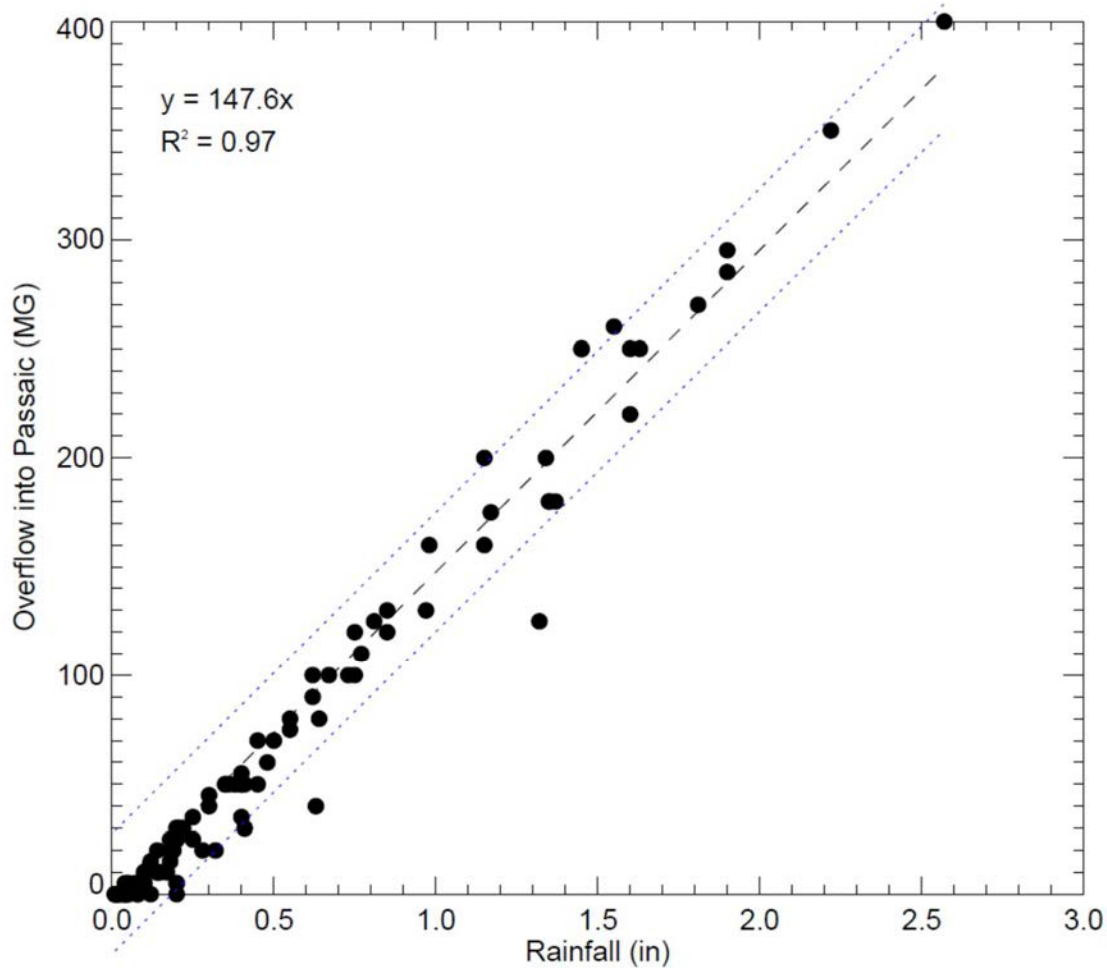


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Figure 3-2**Correlation Between Reported Total Overflow Volume and Daily Rainfall in WY1975**

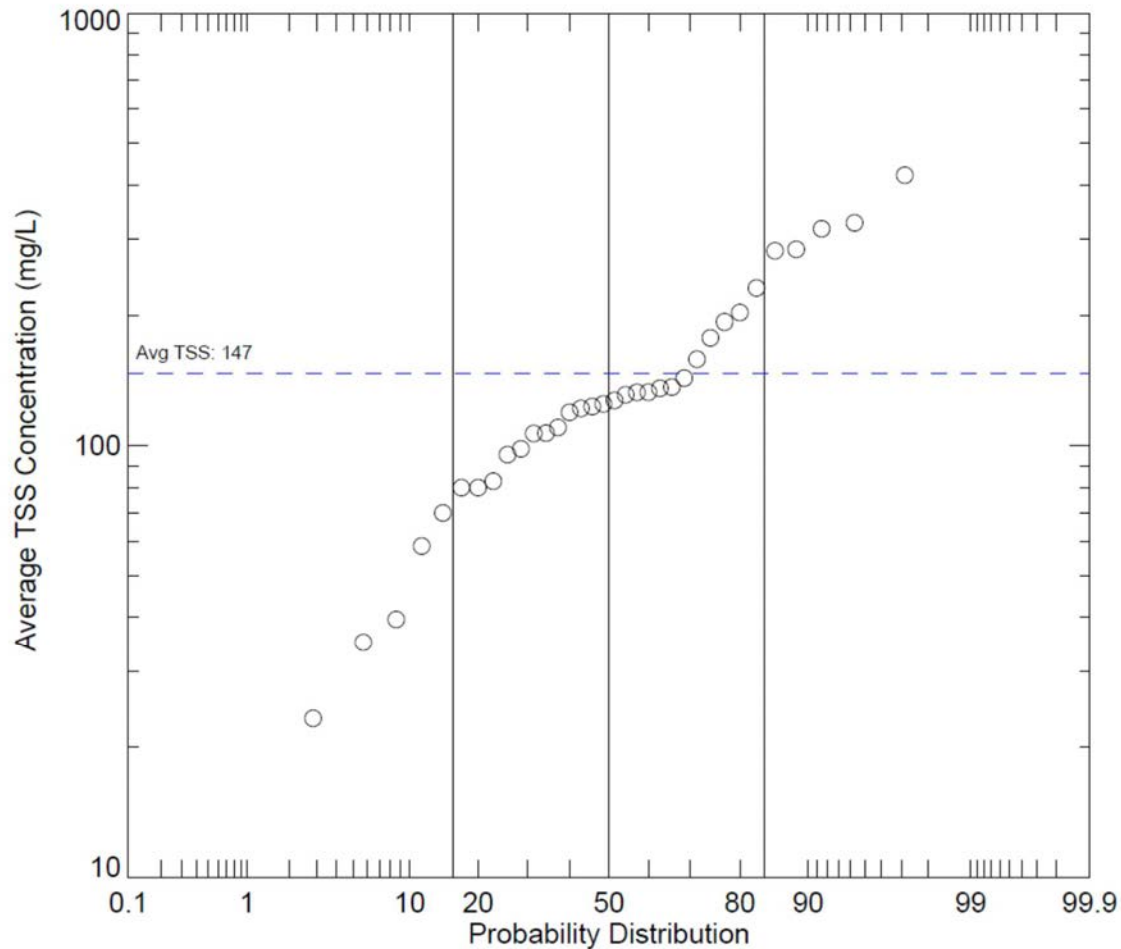
Legend:

- Data
- Regression Line
- 95% Confidence Intervals

Notes:

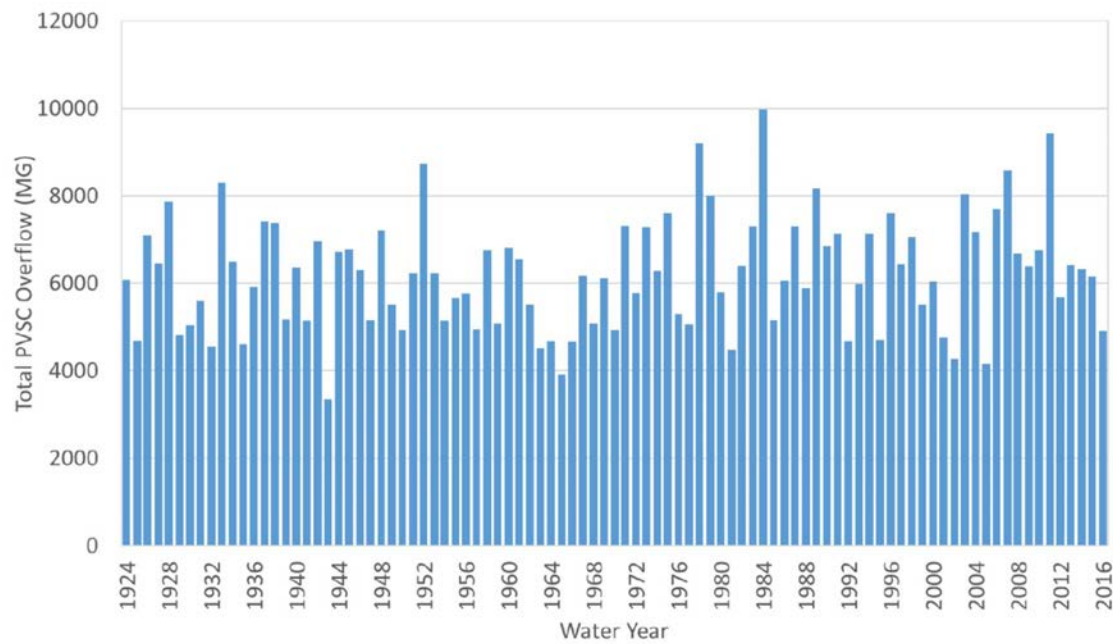
Second River Union manual overflow volumes not included. Overflow from non-PVSC CSOs in Newark not included. Storm sewer overflow not included. Values from Table 6 of 1976 Killam report.

Figure 3-3
Cumulative Frequency Distribution of Average TSS Concentrations Measured during
Overflow Events in WY1975



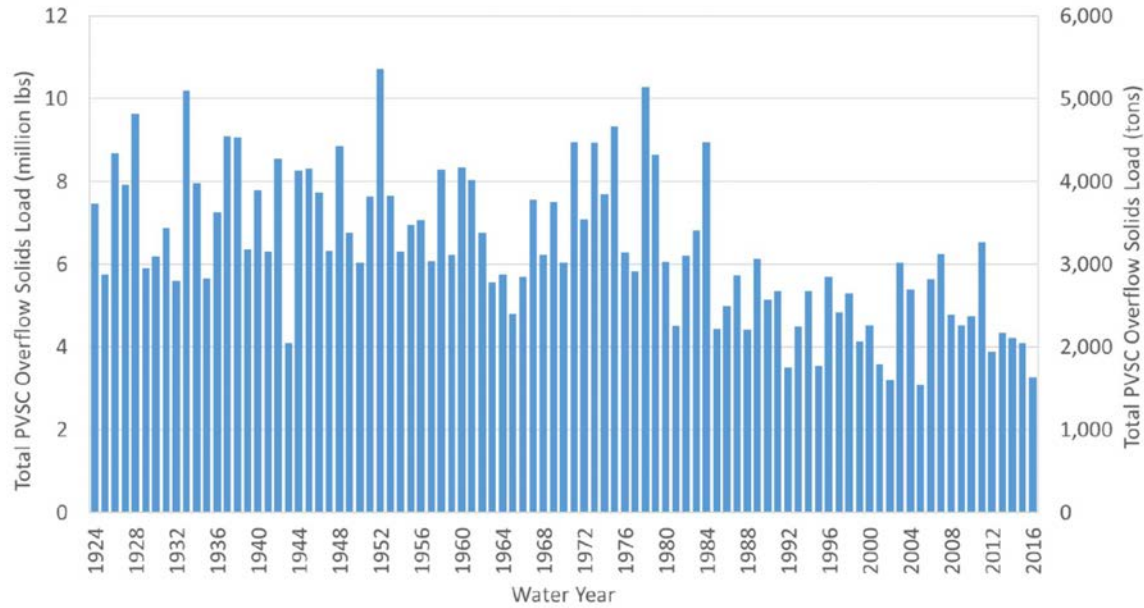
Notes:

TSS measurements collected when overflow not explicitly noted in PVSC report are excluded. Data from all available stations shown.

Figure 3-4**Estimated Annual PVSC Overflow Volume for WY1924 through WY2016**

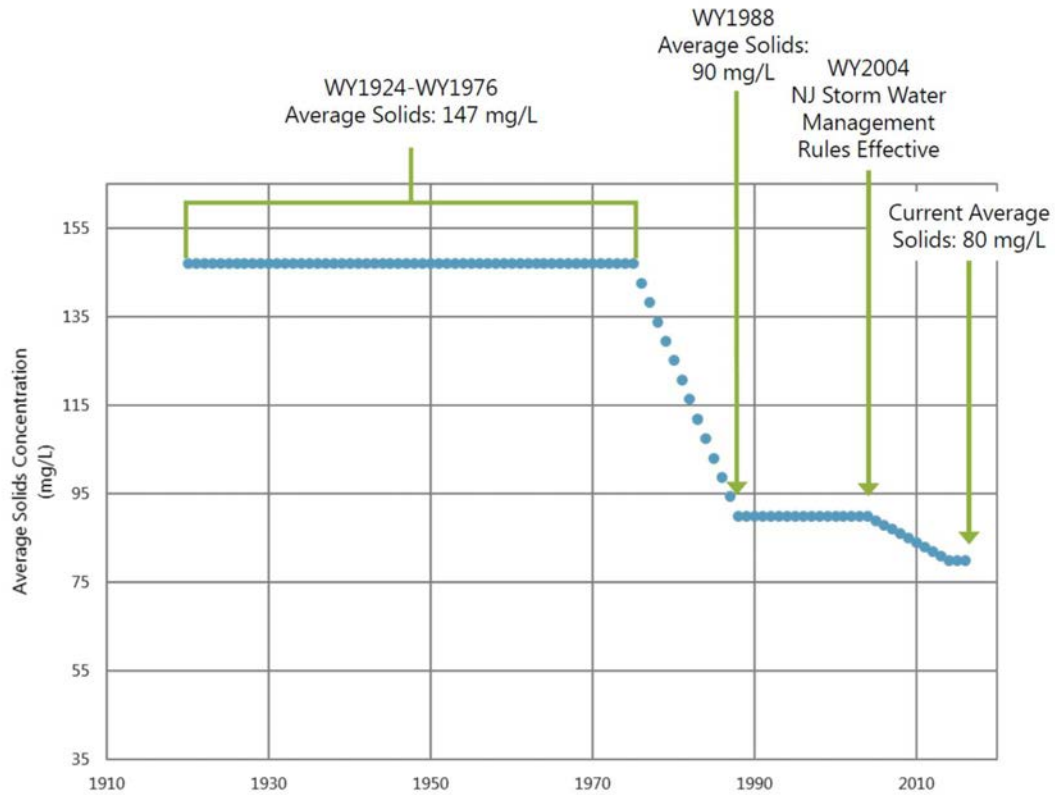
Note:

Manual bypass volumes at Union Outlet excluded.

Figure 3-5**Estimated Annual Solids Loads from the PVSC CSOs to the Passaic River for WY1924 through WY2016**

Note:

Manual bypass volumes at Union Outlet excluded.

Figure 3-6**TSS Concentrations in PVSC Overflows Used for the Load Estimates for WY1924 through WY2016**

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Anchor QEA Annual CSO Estimates

Water Year	Total Overflow Volume (MG)*	Total CSO Load (1E6 lbs)	Total CSO Load (tons)
1924	6,080	7.46	3,729
1925	4,682	5.74	2,872
1926	7,083	8.69	4,345
1927	6,453	7.92	3,958
1928	7,855	9.64	4,819
1929	4,803	5.89	2,946
1930	5,039	6.18	3,091
1931	5,598	6.87	3,434
1932	4,561	5.60	2,798
1933	8,307	10.19	5,096
1934	6,486	7.96	3,978
1935	4,611	5.66	2,829
1936	5,917	7.26	3,630
1937	7,410	9.09	4,545
1938	7,383	9.06	4,529
1939	5,179	6.35	3,177
1940	6,351	7.79	3,896
1941	5,145	6.31	3,156
1942	6,962	8.54	4,271
1943	3,346	4.11	2,053
1944	6,728	8.25	4,127
1945	6,775	8.31	4,156
1946	6,301	7.73	3,865
1947	5,150	6.32	3,159
1948	7,215	8.85	4,426
1949	5,517	6.77	3,384
1950	4,917	6.03	3,016
1951	6,226	7.64	3,819
1952	8,733	10.71	5,357
1953	6,239	7.65	3,827
1954	5,139	6.31	3,153
1955	5,665	6.95	3,475
1956	5,768	7.08	3,538
1957	4,945	6.07	3,033
1958	6,751	8.28	4,141
1959	5,070	6.22	3,110
1960	6,800	8.34	4,171
1961	6,546	8.03	4,016
1962	5,513	6.76	3,382
1963	4,527	5.55	2,777
1964	4,677	5.74	2,869
1965	3,908	4.80	2,398
1966	4,648	5.70	2,851
1967	6,171	7.57	3,786
1968	5,069	6.22	3,109
1969	6,112	7.50	3,749
1970	4,917	6.03	3,016
1971	7,300	8.96	4,478
1972	5,774	7.08	3,542
1973	7,281	8.93	4,466
1974	6,280	7.71	3,853
1975	7,600	9.33	4,663
1976	5,287	6.29	3,146
1977	5,055	5.83	2,916
1978	9,200	10.28	5,138
1979	8,001	8.65	4,323
1980	5,804	6.06	3,029
1981	4,474	4.51	2,253
1982	6,394	6.21	3,103
1983	7,293	6.81	3,406
1984	9,984	8.96	4,480
1985	5,151	4.43	2,217
1986	6,047	4.98	2,492
1987	7,283	5.74	2,868
1988	5,883	4.42	2,210
1989	8,161	6.13	3,065
1990	6,837	5.14	2,568
1991	7,122	5.35	2,675
1992	4,674	3.51	1,756
1993	5,987	4.50	2,248
1994	7,120	5.35	2,674
1995	4,708	3.54	1,768
1996	7,591	5.70	2,851
1997	6,435	4.83	2,417
1998	7,048	5.29	2,647
1999	5,503	4.13	2,067
2000	6,028	4.53	2,264
2001	4,760	3.58	1,788
2002	4,263	3.20	1,601
2003	8,025	6.03	3,014
2004	7,178	5.39	2,696
2005	4,152	3.08	1,542
2006	7,693	5.65	2,825
2007	8,590	6.24	3,119
2008	6,663	4.78	2,391
2009	6,382	4.53	2,264
2010	6,756	4.74	2,368
2011	9,432	6.53	3,267
2012	5,674	3.88	1,941
2013	6,422	4.34	2,171
2014	6,314	4.22	2,108
2015	6,148	4.10	2,052
2016	4,899	3.27	1,635

*Total overflow volume calculated from rainfall data for all years except 1975.
1975 overflows derived from value reported in Killam (1976).

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EXHIBIT 3

NON-PARTICIPATING POTENTIAL PCB PARTIES

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	Company	Street Address	City	Company Information	SIC	Industry Basis/Allegation	URL or Other Source
1	1515 Broad Street, LLC (Hampshire Real Estate, Blim Limited Partnership, Parkway Technical Center)	1515 Broad St.	Bloomfield			Parkway Technical Center listed as a large quantity generator of PCB wastes (1988)	EDR p.28681/31947 4330766.1s.pdf
2	260 Schuyler Avenue Realty Company, LLC (Aquatek)	236-262 Schuyler Ave.	Kearny			Multiple large shipments of PCB wastes to landfill (2005)	EDR p.15238/44205 4326287.1s.pdf
3	297 Getty Avenue Associates	297 Getty Ave.	Paterson			TSCA federal PCB inspection (2003)	EDR p.16158/66158 4319330.2s.pdf
4	3M Company	150-154 Raymond Blvd.	Newark	11 companies including 3M consent to cleaning up Bayonne Barrel site. COCs include PCBs.		electrical insulation materials/wire coatings (Insulation Wires, Inc. (IWI), Newark); chemicals (Cardolite Corp., 500 Doremus Ave, Newark)	"EPA Reaches Agreement with 11 Firms over Superfund Site, 3/22/2005; New Jersey Wood Finishing v. Minnesota Mining Mfg., (D.N.J. 1963); 1974 New Jersey State Industrial Directory, p. G-157
5	A&L DYERS	36 Seabury St.	Newark	Textile dyeing	2399	dyes/inks	EPA, Preliminary Study of the Textile Mills Category, July 1996
6	A-1 Tank Cleaning Service	3 Washington St.	West Orange	Storage tank cleaning		tank cleaning and waste disposal	
7	A. Capone Sanitation, Inc.	178 River St.	Paterson	Categorized under garbage collecting, destroying, and processing.	4953	waste collection/disposal	http://www.whereorg.com/a-capone-sanitation-service-10113309#General-information
8	A.J. & J.O. Pilar Inc.	145 Chapel St.	Newark	Transports and handles hazardous wastes. Receives, recycles, and handles hazardous waste.	2869	waste collection/disposal (including hazardous waste)	http://www.usa.com/frs/aj-jo-pilar-inc.html
9	ABB Lummus Global, Inc.	1550 Broad St.	Bloomfield	Turbines and turbine generator sets.	3511	heat exchanger fluids	http://new-jersey.uskeep.com/company/a-b-b-lummus-global-inc-1.html
10	Abbott Industries	1 Morris St.	Paterson	Industrial supplies, wholesale bottles.	5085	plasticizers	https://www.manta.com/c/mmbz7kj/abbott-industries-inc
11	ABCO Diecasters, Inc.	39 Tomkins Point Rd.	Newark	Founded in 1971, a small zinc diecasting and powder coating company, supplying castings to a varied group of industries that includes architectural hardware, automotive lighting and fuel systems, display items, window hardware, and numerous others.	3479	waxes; hydraulic fluids	http://www.abcodiecasters.com/products.htm ; https://www.manta.com/c/mm29300/abco-die-casters-inc
12	Accurate Box Company, Inc.	86 5th Ave.	Paterson	Paperbox manufacturer.	2754	adhesives: listed as historical large quantity generator of wastes including PCBs (1980)	EDR p.7842/66158 3419330.2s.pdf
13	Accurate Tool & Die Co.	55 Porete Ave.	North Arlington	Manufactures vehicle parts and services vehicles for transmission repair.		waxes for casting; hydraulic fluids	https://www.mechanicaadvisor.com/nj/north-arlington/accurate-tool-and-die-co ; https://www.macraesbluebook.com/search/company.cfm?company=300573
14	Ace Rubber Stamp	14 E. Park St.	Newark	Rubber stamps for stationary stores.		plasticizers	https://www.yelp.com/biz/ace-rubber-stamp-works-newark ; https://www.hotfrog.com/business/nj/newark/ace-rubber-stamp-works
15	Ace Tool & Manufacturing Company	532 Mulberry St.	Newark	Plastics/mold manufacturer; custom injection molding		waxes for casting; plasticizers; hydraulic fluids	www.macraesbluebook.com/search/company.cfm?company=300615
16	Acme Plastics	220 Browertown Rd.	West Paterson	Plastics company started in 1943.		plasticizers	www.acmeplastics.com/about-us
17	Acme Tool & Machine	580 Davis Ave.	Kearny	Machine shop		lubricants/hydraulic fluids	
18	Active Oil Service, Inc. (JM Properties)	101-110 Riverside Ave.	Newark	Installs/removes oil storage tanks/ cleans up oil and hazardous waste spills		shipped PCB oils offsite for incineration (1997)	EDR p.11901/44205 4326287.1s.pdf
19	Adco Chemical Co.	Rutherford & Delancy St.	Newark	Plastics/chemicals	2821	plasticizers; TSCA PCB inspection (1993)	EDR p.38248/44205 4326287.1s.pdf
20	Aircraft Engineering Products, Inc. (Tenant) a/k/a Nell-Joy Industries, Inc./Dundee Mills	2 Ackerman Ave.	Clifton	Starting 1940, manufactured metal components for aircraft (helicopters)	3728	metalworking/manufacturing; lubricants and hydraulic fluids	Weston, Site Contamination Screening Report: Route 21 Freeway Extension Project, July 1990
21	Alben Metal Parts	11 Iowa Ave.	Paterson	Metalworking		hydraulic fluids/lubricants	
22	Albert Steel Drum	324-398 Wilson Ave.	Newark	1974-1977: drum recycling		drum reconditioning	NJIT/NITPA Brownfield Redevelopment Study: Albert Steel Drum Site
23	Alfred Heller Heat Treating Co.	5 Wellington St.	Clifton	Commercial heat treating	3471	heat transfer fluids	
24	Allied Plastic Molds	139 Tenth St.	Saddle Brook	Plastic molds		plasticizers; heat transfer fluids; lubricants	1974 New Jersey State Industrial Director, p. G-140
25	Allstate Paper Box Co.	223 Raymond Blvd.	Newark	Established in 1966: packaging company supplies; custom made set-up boxes for greeting cards, leather goods, etc. Also printing, silk screening, hotstamping, and embossing.	6512	inks; adhesives	https://www.manta.com/c/mmfjwjt/allstate-paper-box-co ; http://allstatepaperbox.com/
26	Alpha Chemical & Plastics/Alpha Gary	1 Jabez St.	Newark	A manufacturer of resins established in 1953 and closed in 2012. Products included epoxy resins, plastics, PVC compounds, and rubber.	2821	plasticizers	www.usbiz.com/NJ/Newark/AlphaGary_Corp_2WG.html ; www.rubbernews.com/article/20000619/NEWS/306199996/alphagary-to-close-plant-add-capacity-to-another ; 1974 New Jersey State Industrial Directory, p. G-140
27	Alpha Industries (Sigma Plastics)	600 Schuyler Ave.	Lyndhurst	polyethylene films and bags	3089	plasticizers	https://www.bloomberg.com/research/stocks/private/snaps_hot.asp?privcapId=4717171 http://www.local.com/business/details/lyndhurst-nj/alpha-industries-corp-124204985/
28	Aluminum Match Plate Co.	194 State St.	Bloomfield	Established in 1950; aluminum and brass foundry.	3365	foundry sands	
29	American Oil and Supply Co	238 Wilson Ave.	Newark	Petroleum products, lubricants, oil, lubricating oils, graphite.	3679 & 2992	lubricants	https://www.cylex.us.com/company/american-oil-supply-co-15796354.html http://www.nytimes.com/1974/06/23/archives/shore-center-on-schedule-people-and-business.html http://www.siccodes.us/searchresults_detail.asp?id=78498

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	Company	Street Address	City	Company Information	SIC	Industry Basis/Allegation	URL or Other Source
30	American Smelting & Refining	150 St. Charles St.	Newark	Non-ferrous metals	3339	PCBs found onsite; purchased PCBs.	1974 New Jersey State Industrial Director, p. G-141; Documentation of Environmental Indicator Determination: RCRA Corrective Action, Federated Metals Corporation, September 28, 2000; Monsanto PCB Sales Summaries, 1958-1959.
31	Ametek, Inc. US Gauge Division (Weston Instruments)	614 Frelinghuysen Ave.	Newark	Founded in 1904; manufactured electrical and electronic measuring and aerospace instruments	3679	PCB violations onsite	http://www.ametekusg.com/products EDR, pp. 43813,43846,43855/51539 4330768.1s-1.pdf
32	Amtrak Div. NJ Transit Rail - Oper., Inc. Penn Station	1 Penn Plaza E.	Newark	Train station; N.J. Transit Headquarters		Historical large quantity generator of wastes including PCBs	EDR, p.18151/44205 4326287.1s.pdf
33	Angelica Health Care Services Group	12 Clinton St.	Newark	Linen services for healthcare		noted for PCB violations	EDR, pp.31159,42268/51539 4330768.1s-1.pdf
34	Anhydrides & Chemicals, Inc.	2 Margareta St.	Newark	Established in 1970: thermosetting materials	2821	plasticizers	https://www.manta.com/c/mm2r0v7/anhydrides-chemicals-inc
35	Apollo Dyeing & Finishing Co.	140 Summer St.	Paterson	Cotton and synthetics dyeing and finishing.	2262	dyeing and finishing	PVSC Industrial Inventory, August 20, 1987, p.3 [TIERRA-B-015472].
36	Aarubco Rubber	9 Troast Ct.	Clifton	Rubber products		rubber; plasticizers	www.aarubco.com
37	Atlantic Casting & Engineering Corp.	810 Bloomfield Ave.	Clifton	Non-ferrous castings; foundry; machining	3369	castings; hydraulic fluids	atlantic-cd.com/en/about-us/history
38	Atlantic Coast Fibers, LLC.	101 7th St. and 75 South St.	Passaic	Large independent processor of recyclables (for 80 years).		waste handling	www.atlanticcoastfibers.com
39	Atlantic Rubber		Little Falls	Rubber and plastic products			
40	Atlas Industrial Mfg.	81 Somerset Pl.	Clifton	Machine shop for the design and manufacture of heat exchangers.		heat transfer fluids	www.atlasindustrial.com
41	Atlas Metal Finishing, Inc.	8 Avenue B	Newark	Electroplating	3471	PCB-containing equipment	PVSC Industrial Inventory, August 20, 1987, p.3 [TIERRA-B-015472].
42	Aurachem	310 S. 3rd	Harrison	Chemicals and coatings		coatings	www.icis.com/explore/resources/news/2000/08/03/118837/us-soverign-specialty-buys-coatings-business-of-aurachem/
43	Avalon Mfg. Co. Inc.	235 River Dr.	Garfield	Screw machine products	3451	hydraulic fluids	1973 New Jersey State Industrial Directory, p. G-48.
44	B.G. Pratt Company, B.G. Pratt Div. of Gabriel Chemical, Miller Chemical and Fertilizer Corp., Pratt Gabriel	204 21st Ave.	Paterson	1965-1980: manufactured herbicides, pesticides and fertilizers.		chemical manufacturing: herbicides pesticides, fertilizers. Dioxin and PCBs found onsite.	SRP Report 2000, Publicly Funded Cleanups Site Status Report, 8/2001, p. 246 EDR, p.14173/66158 4319330.2s.pdf
45	Bacon & Graham	324 E. 25th St.	Paterson	Founded 1939. Manufactures packaging, shipping, and janitorial products.		adhesives and tapes	www.baconandgraham.com
46	Baker Adhesives, Inc.	152 Mount Pleasant Ave.	Newark	Surface active agents and adhesives manufacturing. (wholesaler of adhesives and glues). Founded in or before 1972.		adhesives	https://www.macraesbluebook.com/search/company.cfm?company=1177301
47	Banks Brothers Corp.	24 Federal Plaza	Bloomfield	Established in 1945 to make gasket materials (rubber and miscellaneous plastic products sector).		rubber; plasticizers	https://www.manta.com/c/mmc511t/banks-bros-corporation
48	Baxter Terrace Projects Demolition	57 Sussex Ave.	Newark			Site cap and deed restriction for onsite contamination including PCBs.	EDR, p.27358/51539 4330768.1s-1.pdf
49	Bay State Milling Co.	11 Chester St.	Clifton	Milling whole grains and seeds.		Onsite PCB soil contamination	EDR, p.24253/66158 4319330.2s.pdf
50	Beisler-Weidmann Co. Inc.	233 Courtland St.	Belleville	Founded 1921. Manufactures boxes, tape, packaging supplies, sanitary supplies.		adhesives; tapes	https://businessfinder.nj.com/7530958/Beisler-Weidmann-Co-Inc-Belleville-NJ
51	Bell Container Corp.	615 Ferry St.	Newark	Founded 1919. Manufactures boxes and packaging.		adhesives	www.bellcontainer.com
52	Bellemead Development Corp.	125 Chubb Ave.	Lyndhurst			TSCA PCB inspection	EDR, p.4644/44205 4326287.1s.pdf
53	Bergen Barrel & Drum Co. Inc.	43 - 45 O'Brien St.	Kearny	Founded 1960. Wholesale barrel and drum manufacturer.	5085	TSCA PCB inspection	EDR, p.14231/44205 4326287.1s.pdf
54	Bergen Cable Technologies	170 Gregg St.	Lodi	Founded in 1942 in Lodi. Wire rope and cable assembly industry. Includes various types of cables for aviation (e.g., Boeing). Now located at 343 Kaplan Drive, Fairfield.	3542	wire/cable coatings	https://bizstanding.com/directory/NJ/BE/1435/
55	Bessemer Processing Company, Inc.		Newark	In operation prior to 1963. Drum reconditioning facility engaged in cleaning and reconditioning of used and empty drums for the petroleum and certain other chemical industries (a wholly owned subsidiary of Kingsland Drum and Barrel).		drum reconditioning	https://law.justia.com/cases/new-jersey/supreme-court/1998/a-115-97-opn.html
56	Betosia Manufacturing Corp.	44 George St.	Newark	coatings		coatings; purchased PCBs	Monsanto PCB Sales Records, 1970-1971
57	Big Apple West (Uniroyal factory)	1 Market St.	Passaic	1920s: United States Rubber Company (Uniroyal) rubber plant		Historical large quantity generator of wastes including PCBs	EDR, p.40563/66158 4319330.2s.pdf
58	Bloomfield, Township of, Department of Public Works	230 Grove St.	Bloomfield	Bloomfield Department of Public Works		Soil contamination found with PCBs.	EDR, p.10454/51539 4330768.1s-1.pdf
59	Bogue Electric Manufacturing Co.	100 Pennsylvania Ave. and 76 Iowa Ave.	Paterson	One of the oldest manufacturers of electrical power equipment in the world.	3621	transformers, capacitors, hydraulic fluids, lubricants	www.boguesystems.com
60	Bomont Plastics Corp.	64 Lackawanna Ave.	Totowa	Plastics materials, synthetic resins, and nonvulcanizable elastomers.	2821	plasticizers	
61	Bond Adhesives Co.	301 Frelinghuysen Ave.	Newark	Wholesale adhesives and glue.	5169	adhesives	https://www.manta.com/c/mbd38k6/bond-adhesives-co
62	Bontex Inc.	238 Lindbergh Pl.	Paterson	Supplier of coated, elastomer, elastomer chemistry, thermoplastic, PVC, and vinyl. Started as a leather processing operation.		plasticizers	https://iaspub.epa.gov/enviro/fii_query_detail_disp_prog_m_facility?p_registry_id=110032374099
63	Borden Chemical (Commercial Ink & Lacquer Co.)	8 - 10 22nd St.	Fair Lawn	Borden purchased the site in the 1960s (then owner Commercial Ink & Lacquer Co. had manufactured inks, lacquer, and paints since the 1940s) and manufactured solvent-based printing inks used in food and consumer product industries through the 1990s.	2893	inks; lacquer; paints	Z. Koeske, "NJDEP: State is Overseeing Toxic Site, PEER Report Was 'Misleading'," <i>NJ Patch</i> , February 20, 2012.
64	Boris Kroll Dyeing Co./ Boris Kroll Jacquard Looms, Inc.	66 Gray St., 722-735 20th Ave.	Paterson	Textiles	2269	dyes	https://www.epa.gov/sites/production/files/2019-09/documents/state_and_tribal_response_program_highlights_october-november-december_2018.pdf
65	Bradley Corrugated Box	900 S. 2nd St.	Harrison	Div of Paige Packaging Inc. which was founded in 1955.		adhesives	https://www.manta.com/c/mmb58dk/bradley-corrugated-box-co-inc
66	Brico Industrial Corp.	480 Main Ave.	Wallington Borough			Concrete cap and deed restriction to control PCBs and PAHs	EDR, p.39473/66158 4319330.2s.pdf

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	Company	Street Address	City	Company Information	SIC	Industry Basis/Allegation	URL or Other Source
67	Brooklyn Foundry	70 Pennsylvania Ave.	Kearny	Iron, semi-steel, brass & bronze castings, meal pater work, non-ferrous alloy and ferrous allow centrifugal castings.		castings	https://www.macraesbluebook.com/search/company.cfm?company=305523
68	Brown Chemical Co.	195 Keen St. and Warren St.	Paterson	Founded 1936. Became well-established in the textile trade after WW2. Entered additional markets for specialty chemical manufacturing, industrial and institutional cleaners, pigments, and dyestuffs.		dyes	www.brownchem.com
69	C.E. Lummus Co. (Lummus Corporation)	1515 Broad St.	Bloomfield	1968: machinery and replacement parts for the cotton ginning industry.		heat transfer fluids	
70	C.P.L. Industries Corp.	150 Gregg St.	Lodi			paints/coatings	
71	Cairns & Brothers Inc.		Clifton	Plastics products	3089	plasticizers	
72	Calgon Corporation/Metasol facility (Merck)	200 Wagaraw Rd.	Hawthorne	Polymers, slimicide chemicals, catalysts. Organic and inorganic mercury compounds (mercury compounds produced through 1969, non-mercury compounds through 1991).	2819	transformers	www.nj.gov/dep/newsrel/2006/06_0002.htm ; PVSC Industrial Inventory, 1987, p. 7.
73	Caloric Color Co.	176 Saddle River Rd.	Garfield	Founded in 1963. Manufactures inks.	2899	inks	https://www.manta.com/c/mmb5d6j/caloric-color-co-inc
74	Cambridge Industries of America, Inc.	7 - 33 Amsterdam St.	Newark	Manufacturer of specialty resinous products (Resoflex R-296 and/or Resoflex R766) and plasticizers. Founded in 1950.		plasticizers	https://us.kompass.com/c/cambridge-industries-of-america-inc/usn01804238/
75	Cambridge Pavers Inc.	4 Jerome Ave.	Lyndhurst	Paving stones.		Deed restriction for onsite cap covering PCBs (2001)	www.cambridgepavers.com ; EDR, pp.3582,4980,7672,10740/44205 4326287.1s.pdf
76	Capital City Products Co.	Foot of Sanford Ave.	Kearny	Detergents and edible fat products.	2077	shipped PCBs to landfill	PVSC Industrial Inventory, 1987, p. 7. EDR, p.20238/44205 432687.1s.pdf
77	Capital Container Corp.		Newark			drum reconditioning/waste handling	
78	Cardolite Corp. (3M Corporation Specialty Chemicals Div.)	500 Doremus Ave.	Newark	Manufacturer of epoxy curing agents, resins and diluents, and friction products in the coating, adhesive, and automotive markets.	2892	adhesives/coatings; onsite PCBs (onsite cover and deed restriction)	EDR p.37103/44205 4326287.1s.pdf
79	Cargille Laboratories Inc. (R.P. Cargille Laboratories)	55 Commerce Rd.	Cedar Grove	optical fluids (including PCBs)		PCBs used in optical fluids; PCB wastes shipped to landfill (1983); TSCA PCB inspection.	EDR p.23981/31947 4330766.1s.pdf
80	Casting Technologies	70 Pennsylvania Ave.	Kearny	Metal casting company, nonferrous foundry except aluminum and copper.	3369	castings	
81	Castrol Oils	254-266 Doremus Ave.	Newark	Lubricating oils and greases.	2992	Purchased PCBs	Monsanto PCB Sales Records, 1962 and 1970-1972; 1974 New Jersey State Industrial Directory, p. G-144.
82	Cat Coatings Inc.	181 McBride Ave.	Paterson	Coatings		coatings	
83	Catholic Community Service (NJ Transit Rail Operations)	Raymond Blvd.	Newark			PCB enforcement actions.	EDR, p.31967/51539 4330768.1s-1.pdf
84	CCP Inc.	25 Andrews Dr.	West Paterson	Packaging products.		adhesives	
85	Centerless Products Co.	32 Carol Pl.	Bloomfield	Steel pins, screw machining products, and grinding. (Also located at 39 Verona Avenue, Newark, NJ)		Deed restriction (cap) for wastes including PCBs	EDR, p.28563/31947 4330766.1s.pdf
86	Central Bergen Properties	141 Lanza Ave. Industrial Complex	Garfield			Historical large quantity generator of wastes including PCBs ; spill/soil contamination (1997)	EDR, p.26340/66158 4319330.2s.pdf
87	Central Railroad Co.		Newark	Formed in 1849 by consolidation of two other railroad companies in NJ. Major station in Newark known as Penn Station. Includes numerous tracks and bridges in the Newark area.		hydraulic fluids, lubricants	
88	Central Steel Drum Co.	704 Doremus Ave.	Newark	Drum reconditioning		Shipped PCB wastes to landfill (1988).	EDR, p.38549/44205 432687.1s.pdf
89	Central Waste & Mill Service	395 President St.	Saddle Brook	Waste recycling service.		waste handling	
90	Cerebral Palsey of Essex and West Hudson (First Cerebral Palsy of NJ)	7 Sanford Ave.	Belleville			TSCA PCB inspection.	EDR, p.9120/51539 4330768.1s-1.pdf
91	Certified Metals Corp.	175 Entin Rd.	Clifton	Gold wedding rings	3911	castings	
92	Chapel Estates Property	60-66 Chapel St.	Newark			Deed restrictions (caps) for wastes including PCBs.	EDR, p.22256/44205 4326287.1s.pdf
93	Chem-Fleur Inc.	200 Pulaski St.	Newark	Founded 57 years ago. Makes chemicals including perfumes, flavoring extracts and syrups, cosmetics and toiletries.	2899	Purchased PCBs; PCBs onsite (deed restriction); TSCA PCB inspection.	Monsanto PCB sales records, 1969 and 1971; EDR, p.32575/44205 4326287.1s.pdf
94	Chem Fleur Firmenich, Inc.	928-964 Doremus Ave.	Port Newark	Fragrance chemicals	2869	TSCA PCB inspection.	EDR, p.38938/44205 4326287.1s.pdf
95	CHEM Flowtronics (Chem Flow Corp.)	195 Paterson Ave.	Little Falls	Design and manufacture specialty pharmaceutical, biotech, and chemical process piping components, mixers, and process systems for over 50 years. Sight flow indicators, mixers and agitators, reflux splitters and condensers, process vessels and reactors, drain lines and process piping.		Purchased PCBs	www.chem-flowtronics.com ; Monsanto PCB sales records, 1971
96	Chemical Products	125 Main Ave.	East Paterson/ Elmwood Park	Specialty manufacturing: organic chemical synthesis. Purchased by Grant Specialty Coatings in 1977.		Purchased PCBs	Monsanto PCB Sales, 1970-1972; New Jersey Industrial Directory, Elmwood Park; www.grantcoatings.com .
97	Chemos Corp.	225-235 Emmett St.	Newark	Manufactured coatings for textiles, leather, metal, wood, and plastic.	2841	paints, lacquers, coatings	PVSC Industrial Inventory, 1987, p. 8.
98	Chemplast, Inc. / Saint-Gobain Plastics	250 Goffle Rd.	Hawthorne	Plastics manufacturing. Acquired by Norton Co. in 1981 (which was subsequently acquired by Saint-Gobain Plastics).		plasticizers, coatings	"Norton Co. Will Acquire Chemplast, a Plastics Processor Based...," <i>UPI</i> , December 31, 1981.
99	Circle Rubber USA Incorporated (Global International Trading Co)	408 Frelinghuysen Ave.	Newark	Manufacturer of toy balloons.		plasticizers; deed restriction (onsite cap) for contamination including PCBs.	1974 New Jersey State Industrial Directory, p. G-145.
100	City Electric Motor Co.	184 Mulberry St.	Newark	Electric motors.		PCB violations (1981); large quantity generator PCB wastes (1985); PCB enforcement actions (1988).	EDR, p.32315/51539 4330768.1s-1.pdf
101	Clean Harbor Environmental Services	41 Tomkins Point Rd.	Newark	Hazardous waste collection, treatment and disposal company.		waste handling	
102	Closure & Seal Products	116 Glenridge Ave.	Montclair	Metal closures	3449	sealants, gaskets	1973 New Jersey State Industrial Directory, p. G-145..

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	Company	Street Address	City	Company Information	SIC	Industry Basis/Allegation	URL or Other Source
103	Cobon Plastics	90 South St., 44 Lafayette St.	Newark	A plastic tubing company.	3079	plasticizers	https://www.manta.com/c/mmbpq0f/couse-bolten-co ; 1974 New Jersey State Industrial Directory, p. G-145.
104	Collegiate School Board of Trustees	22 Kent Ct.	Passaic			TSCA PCB inspection	EDR, p. 42995/66158 4319330.2s.pdf
105	Colloids Inc.	382/394 Frelinghuysen Ave.	Newark	Products for adhesives, paint, plastics, rubber, textiles, leather, paper.	2843	adhesives, paints, coatings, plasticizers; Deed restriction on property related to contaminants including PCBs	1960 Industrial Research Labs; PVSC Industrial Inventory, 1987, p.9; EDR, p.42961/51539 4330768.1s-1.pdf
106	Colorama Laminating & Printing	2 Paulison Ave.	Passaic	Finishers of textiles, coated fabrics, automotive trimmings, commercial printing and gravure, laminated plastic plate, sheet and profile shapes.	2269 2295 2754 3083	coatings	www.usa.com/frs/colorama-laminating-printing-inc.html
107	Colter & Peterson (Brush King Manufacturing Inc.)	436 448 E 16th St.	Paterson City	Founded 1932. Manufactures industrial paper cutters and handling machines.		Deed restriction (caps/fencing/signs) for onsite PCB contamination	www.papercutters.com ; EDR, p.9888/66158 4319330.2s.pdf
108	Columbia Textile Service	28 Ryle Ave.	Paterson	Textile dyeing.	2261	TSCA PCB inspection; dyes	PVSC Industrial Inventory, 1987, p.9; EDR, pp.8130,13893/31947 4330766.1s.pdf
109	Comet Chemical	272 Wright St. and 410 Adams St.	Newark	In business by 1960. Industrial coatings: lacquer, thinners, leather and plastic finishes.	2851	coatings	1960 Industrial Research Labs; PVSC Industrial Inventory, 1987, p. 9.; 1974 New Jersey State Industrial Directory, p. G-146.
110	Commercial Plastics	127 Frelinghuysen Ave.	Newark	Plastics materials.		plasticizers	opencorporates.com/companies/us-ri/000022414
111	Commercial Products Company	117 Ethel Ave.	Hawthorne	Finishes and chemicals for the textile industry. Founded in 1944. Chemicals include stiffeners, softeners, and additives such as those providing flame retardancy. Products include resins, dyeing products, catalysts, softeners, and other agents.	2843	coatings, dyes	PVSC Industrial Inventory, 1987, p.9;
112	Construction Adhesive(s) Co.	969 Market St.	Paterson	Adhesives/sealants.		Purchased PCBs; TSCA PCB inspection	Monsanto PCB Sales Summaries, 1971-1972; EDR, p.15633/66158 4319330.2s.pdf
113	Continental Chemical Co.	270 Clifton Blvd.	Clifton	Detergents and emulsifiers.	2814	TSCA PCB inspection conducted	PVSC Industrial Inventory, 1987, p.10; EDR, p.36361/66158 4319330.2s.pdf
114	Cook & Dunn Paint Corp.	167 Kossuth St., 109 St. Francis St.	Newark	Manufacturer of paints, varnishes, lacquers, enamels, and allied products. Existed by late 1940s.	2851	paints, lacquers, coatings	http://www.walterjohnsonfh.com/obituary/Tessie-Pogorzelski/Linden-NJ/1639566 ; PVSC Industrial Inventory, 1987, p.10.
115	Couse And Bolton	42-46 Lafayette St.	Newark	Manufactures rubber, plastic hose/belting (air, water, and gas multipurpose hoses), fluoropolymer lined hoses, acid hoses, air hoses, drill hoses, marine hoses, and oil, water, material handling, and special hoses. Founded 1899.		plasticizers, rubber	New Jersey Industrial Directory, 1952-1953, p. 594.
116	Covar Corp.		Newark	Lithographic varnish powder coat, varnishes, glazes, lusters, lacquers, sealers, shellacs, stains, miscellaneous finishes, and chemicals included bio chemicals and gas materials.		lacquers, coatings	https://www.macraesbluebook.com/search/company.cfm?company=308818
117	Cross Country Box Co.	2-8 Central Ave	E. Orange	Manufacturer of custom made rigid set up boxes and folding cartons from paperboard, chipboard, or cardboard. Customization to suit any requirements. Established 1949.	2652	adhesives	https://www.manta.com/c/mmbpz2j/cross-country-box-co-inc
118	Cummins Metropower Inc. (Enrac Division, Vineland Construction Co.)	41 - 85 Doremus Ave., Routes 1 & 22	Newark	Repair and service diesel engines.	7538	hydraulic fluids; shipped PCB wastes to landfill; TSCA PCB inspection	PVSC Industrial Inventory, 1987, p. 11; EDR, pp.25358,25446/44205 4326287.1s.pdf
119	Curcio Scrap Metal, Inc./Cirello Iron and Steel Co.	416 Lanza Ave.	Saddle Brook Township	Scrap metal yard. Cut electrical transformers onsite. NPL site.		PCB spills from cutting of electrical transformers.	EDR, p.28897/66158 4319330.2s.pdf
120	Cushman & Wakefield	213 Washington St.	Newark			Historical large quantity generator of PCB wastes	EDR, p.28072/51539 4330768.1s.pdf
121	Custom Chemicals	30 Paul Kohner Pl.	East Paterson/Elmwood Park	Inks, Coatings, Adhesives, Pigment Dispersions		Purchased PCBs; inks, coatings, adhesives	New Jersey Industrial Directory, 1975, 1977, 1985; Monsanto Sales Summaries, 1968-1971.
122	D&M Tank Cleaning Inc.	194 Fifth St.	Saddle Brook Township	Tank cleaning.		Historical large quantity generator of wastes, including PCBs	EDR, p.29686/66158 4319330.2s.pdf
123	Dai Color Pope, Inc. (also listed as Daicolor-Pope)	40 Webro Dr.	Clifton	Manufactured pigments and inks.	2865 2899	inks; TSCA PCB inspection	EDR, p.38187/66158 4319930.2s.pdf
124	Dainichiseika Color & Chemicals	Foot of Calcuta & Panama St.	Port Newark	Pigments and inks.		Large quantity generator of PCB wastes	EDR, p.381886/66158 4319330.2s.pdf
125	DCA Food Industries	931 Frelinghuysen Ave.	Newark	Bakery		Purchased PCBs (heat transfer fluid)	Monsanto PCB Sales Summaries, 1968.
126	Deere & Co	22 Passaic St. Bldg. 64E, 54 Passaic St.	Wood Ridge	John Deere Technologies International: Rotary engines		Small quantity generator of PCB wastes	"Deere Ends Effort in Rotary Engines," <i>The New York Times</i> , January 11, 1992; EDR, p.44711/66158 4319330.2s.pdf
127	Deleet Merchandising Corp.	26 Blanchard St.	Newark	Provides offset press process control equipment for water management, chemical blending, chemical recycling, and waste reduction applications. In addition, it offers coatings and adhesives, press washes and solvents, blanket cleaning clothes, plate cleaners, press maintenance products, wide format inkjet printers, DI printing products, and pre-press products. Founded in 1905.		adhesives, coatings, inks	www.sienalending.com/transaction/deleet-merchandising-corporation/
128	Diamond Head Oil Refinery Div. (PSC Resources, Ag-Met Oil Service, Newtown Refining Corporation, Mimi Urban Development Corp., Hudson Meadows Urban Land Development Corp.)	1401 Harrison Turnpike/ Harrison Ave.	Kearny	Oil reprocessing facility. Now a Superfund site.		PCBs found onsite	https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0200484

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	Company	Street Address	City	Company Information	SIC	Industry Basis/Allegation	URL or Other Source
129	Dikeman Laminating Inc.	181 Sargeant Ave.	Clifton	Founded 1949. Coated and laminated paper manufacturer.		Purchased PCBs (heat transfer fluid); TSCA PCB inspection	www.manta.com/c/mmbqf83/dikeman_laminating-corporation; Monsanto PCB Sales Summaries, 1968-1969; EDR, p.36664/66158 4319330.2s.pdf
130	Dinico Products Inc.	220 Goffle Rd.	Hawthorne	Lighting fixtures, switches and controls, relays, circuit protection devices, and electrical hardware and supplies.		Large quantity generator of PCB wastes	www.macraesbludbook.com/search/company.cfm?company=-506758; EDR, p.6551/66158 4319330.2s.pdf
131	DMB Supply Co Inc. (possibly related to Big Apple West)	1 Market St.	Passaic			Large quantity generator of wastes including PCBs	EDR, p.40561/66158 4319330.2s.pdf
132	Dominion Colour Corp. (USA)	19 E. Fifth St.	Paterson	Supplier of pigment powder, colour powders, pigment ink, paint pigments & pigment products. In business 70 years.		dyes, inks	http://www.dominioncolour.com/company/about-us; New Jersey Industrial Directory, Paterson, 1994.
133	Douglas Stephen Plastics	22 Green St.	Paterson	Producer of disposable plastic food packaging and hospital packaging. In business 50 years.		plasticizers	http://douglasstephen.com/about-us/
134	Dri Print Foils		Newark	Hot stamp foils		Purchased PCBs	Monsanto PCB Sales Summaries, 1970
135	Driver Harris Co./ Driver-Harris Alloys Inc. (Harrison Alloys, Inc.)	308 Middlesex St.	Harrison	Manufactured insulated electrical wire and cable.	3356	wire cables/coatings; purchased PCBs; PCB violations	PVSC Industrial Inventory, 1987, p.11; Monsanto PCB Sales Summaries, 1968-1971; EDR, pp.17642,17678/44205 4326287.1s.pdf
136	DSM Resins US, Inc.	5 Paul Kohner Pl.	Elmwood Park	Resins		TSCA PCB inspection	EDR, p.19660/66158 4319330.2s.pdf
137	Dublin Scrap Metal	489 Frelinghuysen Ave.	Newark	Scrap yard/recycling center. Started 1960/expanded 1970.		industrial recycling	https://www.yelp.com/biz/dublin-scrap-metal-newark
138	Dux Paints	187 Garibaldi Ave.	Lodi	Paint manufacturer. Est. 1946		paints	www.duxpaint.com
139	Dyette Corp.	2 Canal St.	Passaic	Fabric dyers.	2257	dyes	PVSC Industrial Inventory, 1987, p.11.
140	East Coast Storage LLC (IGB, Walco Linck Co./ibg Corp.)	1234 Rte. 46	Clifton	Insecticides.		Multiple large shipments of PCB wastes to landfill; historical large quantity generator of wastes including PCBs	EDR, p.24851/31947 4330766.1s.pdf
141	Eastern Molding Co.	597 Main St.	Belleville	Designing and manufacturing natural and synthetic rubber molded products since 1948.		rubber, plasticizers	eaternmoldingcompany.com
142	EGL Company, Inc. (Engineering Glass Laboratories)		Newark	Lighting company, including electrode equipment, aspirators, gauges, mercury traps, graded seals, laboratory glasswear, neon electrodes. Processing equipment included bombardier transformers, diffusion pumps, and vacuum pumps. Founded 1927.		vacuum pumps; transformers; gaskets	www.egl-lighting.com/about/
143	Egyptian Lacquer	80 Jacobus Ave.	Kearny	Manufactured lacquers and chemical coatings.		Purchased PCBs; lacquers	Monsanto PCB Sales Summaries, 1958-1963.
144	Electric Casting Corp.	70 Pennsylvania Ave.	Kearny	Metal and die casting. Founded 1971.		castings	https://start.cortera.com/company/research/k3q9jrm3o/eletric-casting-corp/
145	Electronic Component		Totowa			Purchased large volumes of PCBs	Monsanto PCB Sales Summaries, 1963-1971.
146	Elite Plastics (Intek Plastics)	150 Fifth Ave., Goffle Rd.	Hawthorne	AKA Intek Plastics. Founded 1961. Manufactures custom profile extruded plastic products.	3083	plasticizers	www.intekplastics.com/intek-news/intek-plastics-acquires-elite-plastic/
147	Energy Coatings Co. (Lukens General Indust)	38 Porete Ave.	North Arlington	Coatings		Deed restriction (caps) to control onsite contaminants including PCBs	EDR, p.10463/44205 4326287.1s.pdf
148	Engineered Shapes	113 Dewitt St.	Garfield	Specializes in casting, forging, stamping, die casting, and investment casting. Established 1966.	3363	castings	https://www.manta.com/c/mn2v90x/engineered-shapes
149	Enterprise Container LLC	575 N. Midland Ave.	Saddle Brook	AKA Enterprise Corrugated Container Corporation. Manufactures boxes, sheets, displays, and shipping cartons. Founded 1945.	2653	adhesives	https://corrugated-box-retailers.cmac.ws/enterprise-corrugated-container-corp/7449/
150	Express Container	105 Avenue L	Newark	Est. 1922. Corrugated box manufacturer.		adhesives	http://caselaw.findlaw.com/nj-superior-court-appellate-division/1426172.html
151	Fabrite Laminating	70 Passaic St.	Woodridge	Textile laminating and fabric finishing company. Established 1963.		coatings	https://www.officer.com/on-the-street/body-armor-protection/body-armor-accessories/company/10035580/fabrite-laminating-corp
152	Facile Corp.	185 Sixth Ave.	Paterson	Coats metals and fabrics with adhesive films. Founded in 1947.		coatings, plasticizers, adhesives; purchsed PCBs	Monsanto PCB Sales Summaries, 1963-1964.
153	Fairfield Textiles	2 Wood St., 34 Waite St.	Paterson	Textiles.		dyes	http://www.buzzfile.com/business/Paterson-Laundry.And.Die-Div-973-227-1656
154	Fairmont Chemical Co. Inc.	117 Blanchard St.	Newark	Manufacture and distribution of specialty and fine organic chemicals. Founded in 1938.	2865	PCB violations; shipped PCBs to landfill	EDR p.20537/44205 4326287.1s.pdf
155	Farnow Inc.	77-81 and 89 Jacobus Ave.	South Kearny	Manufactured varnishes, alkyds, and latexes for paint manufacturers.		paints; purchased PCBs	Monsanto PCB Sales Summaries, 1969-1970; United States v. Farber, No. 86-3736 (D.N.J.) March 16, 1988.
156	Federal Broadcasting WMCA Radio Transmit	948 Belleville Turnpike	Kearny	Radio transmission station.		Small quantity generator of PCB wastes	EDR, p.16142/44205 4326287.1s.pdf
157	Federated Metals Corp.	150 Saint Charles St.	Newark	Smelting and refining of non-ferrous metals.		Shipped PCB wastes to landfill and incinerator	EDR, pp.26844,34269/44205 432687.1s.pdf
158	Ferrante Electric		Passaic			Purchased PCBs	Monsanto PCB Sales Summaries, 1968.
159	Fidelity Chemical Products Corp. (see also OMG Fidelity, Inc.)	470 Frelinghuysen Ave.	Newark	Produces electroplating chemicals and metal concentrates. F/K/A Auric Corp.		TSCA PCB inspection	EDR, p.43496/51539 4330768.1s-1.pdf
160	Film Capacitors	100 8th St.	Passaic	Capacitors.		Purchased PCBs (for capacitors)	Monsanto PCB Sales Summaries, 1974.
161	Finch Fuel Oil Company.	7 Linden Ave.	Kearny	Oil company.		Complaint regarding improper disposal of PCBs	EDR, p.10337/44205 432687.1s.pdf
162	Fire Station #2	109 Kearny Ave.	Kearny	Fire station.		Deed restriction (cap) for onsite PCB contamination	EDR, p.12430/44205 4326287.1s.pdf
163	Fisk Alloy Wire, Inc.	10 Thomas Rd N.	Hawthorne	Produces copper alloy wire, alloy conductors, aerospace appliance, defense electronic connectors, and plated wire for electronic components and conductors. Founded in 1973.		wire coatings	http://fiskalloy.com
164	Form Cut Industries, Inc.	197 Mt. Pleasant Ave.	Newark	Terminal pins; plastic molded plastic inserts and cold-headed parts; hinge pins and hermetic seals. Founded in 1961		plasticizers	http://www.formcut.com/
165	Friez Mfg.		Clifton			Purchased PCBs	Monsanto PCB Sales Summaries, 1968.

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166	Fruit of the Loom Inc. (Industrial Rental)	11 Jackson Rd.	Totowa	Textiles and textile products.		Historical large quantity generator of wastes including PCBs	EDR, pp.8927,10530/31947 4330766.1s.pdf
167	G&S Motor Equipment Co. (see also Transformer Lab Services Inc.)	1800 Harrison Ave.	Kearny	Expert removal, recycling, disposal and repair of transformers and other oil-filled electrical equipment. Founded 1963.	4953	transformers; TSCA PCB inspection	http://www.gstechnologies.com/ EDR, pp.27379,27386,27513/44205 4326287.1s.pdf
168	G&S Motor Equipment Co. Inc. (J. Supor & Son Co., J. Supor & Son Rigging & Trucking Co.)	2 Bergen St.	Harrison	Expert removal, recycling, disposal and repair of transformers and other oil-filled electrical equipment.	4953	transformers; TSCA PCB inspection	http://www.gstechnologies.com/ EDR, pp.17480,17495,17516/44205 4326287.1s.pdf
169	G.J. Chemical Co. Inc.	128 Doremus Ave. and 370 Adams St.	Newark	Chemical supplier, bulk tank storage, lab services.	5169	TSCA PCB inspection	http://gjchemical.com/ EDR, p.33046/44205 432687.1s.pdf
170	Gaess Environmental Service	253 River Dr.	Passaic	Waste handling.		waste handling	http://www.nj.gov/dep/passaicdocs/docs/3rd-PartyComplaintNexusPackages/3rd-PartyComplaintDexus/ChemWasteMgmtSite-ChemWasteMgt.pdf
171	Gaeta Recycling	278 W. Railway Ave.	Paterson	Solid waste removal and recycling since 1935.		waste handling	http://gaeta recycling.com/
172	Galaxie Chemical Corp.	26 Piercy St.	Paterson	Manufactures Cyclic Crudes/Intermediates/Dyes Carbon black, Inorganic metal oxides, Titanium dioxide, Organic pigments, Pigments	2865	dyes; TSCA PCB inspections	https://www.macraesbluebook.com/search/company.cfm?company=506734; PVSC Industrial Inventory, 1987, p. 15; EDR, p.7637/31947 4330766.1s.pdf
173	Gamma Dyeing and Finishing Corp.		Paterson	Dyeing		dyes	
174	Garden State Equities, Inc.	134 Evergreen Place 5th Floor	East Orange			TSCA PCB inspection (2000).	EDR, p.15754/51539 4330768.1s-1.pdf
175	Garden State Paper Co.	950 River Dr.	Garfield	Opened 1961; closed Dec. 7, 2001 due to Enron bankruptcy.	2621	recycled paper; PCB violations; PCB transformer spill	www.recyclingtoday.com/article/garden-state-closing/; EDR, p.26439/66158 4319330.2s.pdf
176	General Color Co.	24 Avenue B	Newark	Existed in 1948. Chemical pigments/dyes.	2816	dyes: deed restriction for wastes including PCBs.	1974 New Jersey State Industrial Directory, p. G-150; EDR, p.40993/51539 4330768.1s-1.pdf
177	General Instrument Corp.	65 Gouverneur St.	Newark	Capacitor Division. Manufactured capacitors, mica, and electrolytic film.	3679	capacitors; purchased PCBs	1974 New Jersey State Industrial Directory, p. G-150; Monsanto PCB Sales Summaries, 1961-1962.
178	General Plastics Corp. (PMC Inc.)	55 La France Ave.	Bloomfield	Established in 1950. Applicator of fluoropolymer coatings and other engineered coatings.		Shipped PCB wastes to incinerator (1995); coatings	www.generalplasticscorp.com; EDR, p.10546/51539 4330768.1s-1.pdf
179	General Services Administration	970 Broad St. Room 939A	Newark			Historical small quantity generator of wastes including PCBs.	EDR, p.30030/51539 4330768.1s-1.pdf
180	Gerin Mfg. Co.	683 North Fifth St.	Newark	Electric heat transfer thermal liquids.	2899	heat transfer fluids; purchased PCBs.	1974 New Jersey State Industrial Directory, p. G-151; Monsanto PCB Sales Summaries, 1969.
181	Gibraltar Chemicals & Plastics Corp.	199 Garibaldi Ave.	Lodi	Chemicals.		TSCA PCB inspection	EDR, p.30833/66158 4319330.2s.pdf
182	GlaxoSmithKline Consumer Healthcare LP	65 Industrial St. South	Clifton	Oral care products.		Large quantity generator of PCB wastes (1996).	http://www.nj.com/business/index.ssf/2013/10/glaxosmithkline_to_close_clift.html EDR, p.50910/66158 4319330.2s.pdf
183	Global International Trading Co. (see also Circle Rubber USA)	422 - 440 Frelinghuysen Ave.	Newark	Trading company.		Deed restrictions (cap) for onsite contamination including PCBs.	EDR, p.43369/51539 4330768.1s-1.pdf
184	GOKO Inc. (Major Goldfinger)	236-242 South St.	Newark			Large quantity generator of PCB wastes; multiple shipments of PCB wastes to landfill and incinerator.	EDR, p.44467/51539 4330768.1s-s.pdf
185	Great Atlantic Pacific	281 Ferry St., 33 Queen St.	Newark	Bread and bakery products.	2051	heat transfer fluids; purchased PCBs.	Monsanto PCB Sales Summaries, 1969-1970; United States v. Farber, No. 86-3736 (D.N.J. March 16, 1988.
186	Greater New York Box Co.	Entin Industrial Tract	Clifton	Manufactured boxes. Existed during 1972. Sold to BRG Holdings LLC in 2003.		adhesives	http://www2.scc.rutgers.edu/ead/manuscripts/williams02f.html
187	Grewe Plastics, Inc.		Newark	Since 1947. Plastic materials and quality custom fabrication		plasticizers	http://greweco.com/
188	H&S Chemical Co.	5264 Van Dyke St.	Wallington	Founded 1944. Organic and inorganic color pigments.	2865	dyes; TSCA PCB inspection.	PVSC Industrial Inventory, 1987, p. 16; EDR, p.57191/66158 4319330.2s.pdf
189	H. Kohnstamm & Co.	Bergen & Harrison Ave.	Kearny	Pigments; flavors. Plant in Newark as of 1959. Also P.O. Box 13, Harrison, NJ.	2087	dyes	PVSC Industrial Inventory, 1987, p.16.
190	Hap Industries		Garfield	Lighting.		light ballasts	
191	Harbor Freight	301 Craneway St.	Port Newark	Trucking, warehousing, and distribution company.		TSCA PCB inspection	www.harborusa.com; EDR, p.42684/44205 4326287.1s.pdf
192	Hardman Inc.	47-55 Riverdale Ave.	Belleville	Rubber cements and compounds. Acquired by Royal Adhesives and Sealants in 2005.		Purchased PCBs; adhesives/rubber	Monsanto PCB Sales Summaries, 1968-1972; New Jersey Industrial Directory, 1952/53; Royal Adhesives Acquires Hardman Adhesives and Elastomers, <i>ASI Adhesives & Sealants Industry</i> , June 27, 2005.
193	Hartin PT-Filler (Hartin Paint & Filler Corp.)	590 Belleville Tnpk.	Kearny	Industrial finishes and metal fillers.		paints/coatings; purchased PCBs.	1974 New Jersey State Industrial Directory, Kearny; Monsanto PCB Sales Summaries, 1968-1972.
194	Heisler Machine & Tool Company	224 Passaic Ave.	Fairfield	Founded 1920. Started as a machining and welding company. Then built equipment for textile industry and paint industry.		hydraulic fluids; heat transfer fluids; purchased PCBs.	www.heislerind.com
195	High Vacuum Technology (High Vacuum Metals/High Vacuum Mfg.)	180 Dayton Ave.	Passaic	Metallic yarn; laminating plastic.		coatings; TSCA PCB inspection with violations; purchased PCBs.	1974 New Jersey State Industrial Directory, Passaic; Monsanto PCB Sales Summaries, 1963-1973. EDR, p.28257/66158 4319330.2s.pdf
196	Hillside Fidelco Associates	487 Hillside Ave.	Hillside			Historical large quantity generator of wastes including PCBs.	EDR, pp.35596,39645/51539 4330768.1s-1.pdf
197	Hoboken Paints, Inc.	40 Industrial Rd.	Lodi	Paints.	2851	paints	http://www.hudsonreporter.com/view/full_story/1913139/article-15th-and-Adams-Corner-where-my-father-s-Hoboken-Paints-stood-then-and-now-?instance=search_results; PVSC Industrial Inventory, 1987, p. 17.
198	Honig Chemical & Processing Corp.	414 Wilson Ave.	Newark	Industrial organic chemicals since 1970, GNL recipient.	2818	TSCA PCB inspection	PVSC Industrial Inventory, 1987, p. 17; EDR, p.363362/44205 4326287.1s.pdf
199	Hy-Test Packaging Corp.	515 E 41st St.	Paterson	Liquid cleaning products; fuel additives.		TSCA PCB inspection.	2006 New Jersey Industrial Directory, Paterson; EDR, pp.15055,18180/66158 4319330.2s.pdf

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200	IGI Adhesives, Inc.	Page Ave. & Orient Way	Lyndhurst	Adhesives.		adhesives	bizstanding.com/directory/NJ/NJ/235/
201	Imperial Container	141 North 13th St.	Newark	Existed by at least 1965. Corrugated boxes/cartons.	2653	adhesives	1974 New Jersey State Industrial Directory, p. G-153.
202	INDOL Color Div.-of Magruder Color Cosmetic Resource Manufacturing L.L.C.		Belleville	Dyes; pigments. Est. 1927.		dyes, coatings	https://www.bloomberg.com/research/stocks/private/snaps_hot.asp?privcapId=4289772
203	INDOL Color Div.-of Magruder Color Cosmetic Resource Manufacturing L.L.C.		Harrison	Pigments and resins.		dyes, coatings	
204	INDOL Color Div.-of Magruder Color Cosmetic Resource Manufacturing L.L.C.	1029 Newark Ave., 1 Virginia St.	Newark	Pigments and resins. (See also Ad-Co-Color, 66 Lister Ave., Newark, purchased in 1964).	2865	dyes, coatings	PVSC Industrial Inventory, 1987, p. 18; U.S. Tariff Commission, Synthetic Organic Chemicals, 1950, p. 147.
205	INDOL Color Div.-of Magruder Color Cosmetic Resource Manufacturing L.L.C.		Paterson	Pigments and resins.		dyes, coatings	
206	INDOL Color Div.-of Magruder Color Cosmetic Resource Manufacturing L.L.C.		Clifton	Pigments and resins.		dyes, coatings	
207	Industrial Latex Corp.	350 Mt. Pleasant Ave.	Wallington	1951-1983: manufactured adhesives and natural/synthetic rubber compounds. NPL site in March 1989.		PCBs used as a flame retardant for rubber and adhesives. Purchased PCBs. PCBs found onsite.	http://www.northjersey.com/story/news/2017/09/07/wallington-contractor-odds-over-rental-former-superfund-site/634882001/ ; https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0201073#blkground ; Monsanto PCB Sales Summaries, 1968-1972; EDR, p. 45798/66158 4319330.2s.pdf
208	International Central Corp.		Caldwell/Fairfield			Purchased PCBs.	Monsanto PCB Sales Summaries, 1970.
209	International Veiling Corp.	244 Hazel St.	Clifton	Since 1904. Dyeing and finishing.	2213	dyes	https://www.internationalveiling.com/ ; PVSC Industrial Inventory, 1987, p. 18.
210	Jencraft Corp.	1 Taft Rd.	Totowa	Manufactured window blinds.		plasticizers; coatings; Historical small quantity generator of PCB wastes.	www.businessinsurance.com/article/19980920/STORY/10006025?template=printart ; EDR p. 9233/31947 4330766.1s.pdf
211	Jersey State Chemical Corp.	59 Lee Ave.	Haledon	Makes polymer and copolymer emulsions for use in water-based paints, floor polishes, flexible adhesives, and for use as pigment binders, sizing, and fillers. (Current address of MRL Manufacturing Corporation.)		paints, adhesives, floor wax	1973 New Jersey State Industrial Directory, Haledon.
212	Jiffy Mfg.	360 Florence Ave.	Hillside	Bags and containers.		Purchased PCBs	Monsanto PCB Sales Summaries, 1964-1971.
213	John L. Armitage Co.	245 Thomas St.	Newark	Chemical coatings business started in 1876. Currently located in Gallatin, TN.	7391	Purchased PCBs; coatings	PVSC Industrial Inventory, 1987, p. 19; Monsanto PCB Sales Summaries, 1965 and 1971.
214	Johnson & Taylor Excavation (Hawk Repossessions)	1173 Goffle Rd.	Hawthorne	Excavator.		Suspected PCB contamination at site (1992); waste handling.	EDR, p. 3313/66158 4319330.2s.pdf
215	Johnson Forging	294-306 Thomas St.	Newark	Iron & steel forgings. Established in 1941.	3392	castings	1974 New Jersey State Industrial Directory, p. G-154.
216	Kearny Twp. of Harrison Ave. Landfill	Harrison & Bergen Ave. S.	Kearny	Landfill.		Multiple shipments of PCB wastes to landfill.	EDR, p. 19996/44205 432687.1s.pdf
217	Keith Industries, Inc.	248 Aster St.	Newark	Distributes drums and containers. Offers new and reconditioned plastic, steel, and fiber drums; triple tight and oblong cans; steel and plastic pails; and totes. Founded in 1961.		drum reconditioning/waste handling	http://www.keithindustries.com/
218	Kikuchi Color & Chemical Corp.	19 East Fifth St.	Paterson	AKA Dominion Colour (subsidiary spun off/sold 2008). Pigments/dyes.	2816	dyes, inks	https://www.highbeam.com/doc/1G1-179533039.html ; PVSC Industrial Inventory, 1987, p. 19.
219	Kingsland Drum & Barrel Co., Inc.	308 Miller St.	Newark	Drum reconditioning.	5085	waste handling	PVSC Industrial Inventory, 1987, p. 19.
220	Kohnstamm & Co.	Harrison Ave.	Kearny	Food colors; flavors; dyes.		dyes; heat transfer fluids.	http://www.colorantshistory.org/HKohnstamm.html ; 1974 New Jersey State Industrial Directory, Kearny.
221	Kolb Sheet Metal	172 Pennsylvania Ave. and 30 Orange St.	Newark	Founded 1947. Sheet metal products, ventilating systems, heavy and welded sheet metal work.		hydraulic fluids	New Jersey Industrial Directory, 1952-53, p. 609; The Metal Industry, Vol. 19, No. 12, p. 500.
222	Kramer Chemicals	109 Fifth Ave.	Paterson/Clifton	Chemicals	5161	Purchased PCBs	PVSC Industrial Inventory, 1987, p. 20; Monsanto PCB Sales Summaries, 1966.
223	Kremetz & Co. (Elrica Urban Renewal Association)	375 McCarter Hwy.	Newark	Jewelry. Founded 1866. Operations scaled down, ceasing gold overlay operations, and relocated, in the 1990s.	3911	PCB transformers; shipped PCBs to landfill	PVSC Industrial Inventory, 1987, p. 20; EDR, p. 41208/51539 4330768.1s-1.pdf
224	Lamart Corp.	16 Richmond St.	Clifton	Pressure sensitive tapes and EMI/RFI shielding laminates. Established in 1956.		adhesives	http://lamartcorp.com/
225	Landover Warehouse	360 Bergen Ave.	Kearny	Warehouse.		PCB spill (1986); illegal dumping (1990).	EDR, p. 15315/44205 432687.1s.pdf
226	Laurel Rubber/Laurel Co.	129 Grand St.	Garfield	Rubber.		rubber; purchased PCBs	1956/57 and 1973 New Jersey Industrial Directories, Garfield; Monsanto PCB Sales Summaries, 1970.
227	Lawter Chemicals	24 Jacobus Ave.	South Kearny	Colors/dyes. (Also a site in Newark.)		purchased PCBs	Monsanto PCB Sales Summaries, 1966; Ad in <i>Flying Magazine</i> , August 1958, p. 71.
228	Lazon Paints (Landzettell & Sons)	17-12 River Rd.	Fair Lawn	Established 1932. Paint and coating manufacturing. Moved in 1949 to current location.		paints	www.landzettellandsons.com/our-story
229	Leader Dyeing & Finishing Co., Inc.	94 Madison Ave.	Paterson	Textile processing; dyeing.	2261	dyes	PVSC Industrial Inventory, 1987, p. 20.
230	Liberty Machine Co., Inc.	275 4th Ave.	Paterson	Vinyl printing equipment, embossers, laminators, coaters, and polishing units.		Purchased PCBs; TSCA enforcement action (1985/86); small quantity generator of PCB wastes.	Monsanto PCB Sales Summaries, 1964-1972; New Jersey Industrial Directories, Paterson, 1955, 1960, 1965, 1970, and 1975; EDR, p. 8467/66158 4319330.2s.pdf
231	Liquid Carbonic Corp.	630 Washington Ave.	Belleville	Established 1946. Manufactured liquid carbon dioxide and dry ice.		heat transfer fluids	"Industrial News," <i>Chemical Engineering News</i> , Vol. 24, No. 10, May 25, 1946, pp. 1388-1404.
232	Liquid Carbonic Corp. (Liquid Carbonic Specialty Gas Corp.)	603 Bergen St.	Harrison	Industrial gases. (Note there was an additional industrial gas plant in Kearny, NJ.)	2813	Shipped PCB wastes to landfill (1997).	EDR, p. 17438/44205 4326287.1s.pdf

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233	Litton Industries (Monroe Systems for Business, Monroe Calculating Machine, Munroe Calculator)	555 Mitchell St. and 550 Central Ave.	Orange	Established 1913 in Orange as the Monroe Calculating Machine Company. Manufactured adding calculators. Acquired by Litton Industries in 1958. Now owned by Arlington Industries.		Purchased PCBs.	Monsanto PCB Sales Summaries, 1969; New Jersey Industrial Directories, Orange, 1952/53 and 1974.
234	Lonza, Inc.	22-10 Rt. 208	Fair Lawn	Chemicals: Niacin, Sorbitol, Tertiary Amines, Surfactants, Organic Intermediates.		PCB violations (1987 and 1998).	New Jersey Industrial Directory, Fair Lawn, 1975; EDR, pp. 5689, 10413/66158 4319330.2s.pdf
235	Louis A. Nelson, Inc.	224 Glenwood Ave.	Bloomfield	Plastics/mold maker. Est. 1947. Lodi Monument Works. Cast Bronze and Aluminum plaques, Civic Memorials, Granite Signs, Markers to Headstones, Urns, Pet Markers, Mausoleums, and Custom Memorials. Established in 1979.		heat transfer fluids; casting molds; plasticizers	https://www.manta.com/c/mmbpd0r/louis-a-nelson-inc
236	Lubrizol Advanced Materials, Inc.	1 Styertown Rd.	Clifton	Plastic Materials and Resins, Molding Compounds, Plastics. Founded 1947	2821	plasticizers, adhesives, lubricants	http://www.lanelson.com/
237	Lummus Co. (Lummus Crest Inc.)	1515 Broad St.	Bloomfield	Chemical engineering services; engineering pilot plant work.	8911	Purchased PCBs	http://www.usbizs.com/NJ/Bloomfield/AB8_Lummus_Crest_1AnX.html; PVSC Industrial Inventory, 1987, p. 21; Monsanto PCB Sales Summaries, 1971.
238	Maas & Waldstein	437 Riverside Ave.	Newark	Paints, varnish, lacquers.	2551	Purchased PCBs; paints/varnish/lacquers	Monsanto PCB Sales Summaries, 1964-1971; 1974 New Jersey State Industrial Directory, p. G-155.
239	MAC Products, Inc.	60 Pennsylvania Ave.	Kearny	Electric utility/transit products since the 1960s. Design and manufacture electro-mechanical products and equipment.		gaskets, wire cables, lubricants, hydraulic fluids, gasket sealants, coatings, vacuum pumps	http://www.macproducts.net/; 1974 New Jersey State Industrial Directory, Kearny.
240	Macys - Newark	131 Market St.	Newark	Department store.		Historical large quantity generator of PCB wastes; TXCA PCB inspection with violations found.	EDR, pp. 28193, 28199/51539 4330768.1s-1.pdf
241	Magna Tran Inc. (Magnatran Inc.)	248 Schuyler Ave.	Kearny	Transformers.		Purchased PCBs; transformers	New Jersey Industrial Directories, 1952/53 and 1974; Monsanto PCB Sales Summaries, 1968-1971.
242	Magnetic Engineering	1940 Van Houten Ave.	Clifton	Electro-magnets for industrial and road sweeping applications.		Purchased PCBs	Monsanto PCB Sales Summaries, 1969; Budocks Technical Digest, Issue 8, February-March, 1950, p. 18.
243	Magruder Color Company, Inc. (EC Pigments)	1 Virginia St.	Newark	Manufacturer and marketer of specialty organic pigments and pigment preparations for coatings, graphic arts, and plastics industries since 1940s.	2865	dyes	1974 New Jersey Industrial Directory; PVSC Industrial Inventory, 1987, p. 21.
244	Main Trucking & Rigging Co., Inc.	Wallace St. - Extension	Elmwood Park	Rigging, trucking, hauling, warehousing.		Historical large quantity generator of PCB wastes	www.maintrucking.com; EDR, p. 18690/66158 4319330.2s.pdf
245	Malcolm Nicol	37 Cutter Ave.	Hawthorne	Chemicals.		Purchased PCBs	Monsanto PCB Sales Summaries, 1969-1971; New Jersey Industrial Directories, Hawthorne, 1956 and 1974.
246	Manchester Metals Inc.	600 Cape May St.	Harrison	Metal fabrication/decorative metals.		castings; coatings	us-business.info/directory/harrison-nj/part2/#M
247	Manhattan Printing Works	South St.	Passaic	Textile printing.		dyes	New Jersey Industrial Directory, Passaic, 1952/53.
248	Manner Textile Processing Corp. (Manner Dyeing & Finishing)	293 Morrissee Ave.	Haledon	Textile piece goods.	2261	dyes	PVSC Industrial Inventory, 1987, p. 21.
249	Mannkraft Corp.	1000 U.S. Highway #1	Newark	Founded 1945. Corrugated box/carton manufacturing.	2649	adhesives	https://www.bloomberg.com/research/stocks/private/snaps_hot.asp?privcapId=6516318; PVSC Industrial Inventory, 1987, p. 21.
250	Marcal Manufacturing, LLC (a/k/a Marcal Paper Mills Inc.)	1 Market St.	Elmwood Park	Household paper products.	2611	TSCA PCB inspection; PCB violation	PVSC Industrial Inventory, 1987, p. 22; EDR, p. 19279/66158 4319330.2s.pdf
251	Marchem (Marcem Dublon Inc.)	84 Waydell St.	Newark	Plastic materials, synthetic resins, anti-friction materials, self-lubricating bushings, plastic assemblies.		plasticizers	www.macraesbluebook.com/search/company.cfm?coompany=320878
252	May National Corp. (May National Associates)	Forbrihten Rd., 1700 Route 3	Clifton	caulking, adhesives, sealants. Founded 1910.		caulking, adhesives, sealants	start.cortera.com/company/research/k3q6mts7o/may-national-associates-inc/
253	Mebane Packaging	300 Hoyt St.	Kearny	Est. 1969. Now a division of WESTVACO (2000). Makes paper cartons, displays, litholamination.		adhesives	www.icis.com/explore/resources/news/1999/11/29/99723/u s-westvaco-to-buy-mebane-packaging/
254	Metro Hydraulic Jack Co. of N.J. (subs. Of MS Hydraulic Equipment Corp.)	141 N.J. Railroad Ave.	Newark	Est. 1941. Hydraulic jacks.		hydraulic fluids	1974 New Jersey State Industrial Directory, p. G-157.
255	Midland Color Div. of Sakata Inx (Inx International Ink Co.)	481 River Rd.	Clifton	Inks/coatings producer.		inks	
256	Midwest Piping		Clifton	Pipes and fittings.		Purchased PCBs	Monsanto PCB Sales Summaries, 1960.
257	Minor Rubber	122 Ackerman St.	Bloomfield	Est. 1914. Rubber specialty products and hardware for industrial market.		rubber plasticizers	1974 New Jersey State Industrial Directory, Bloomfield.
258	Miracle Manufacturing	86 Lackawanna Ave.	West Paterson/ Little Falls	plastics fabricating/plastics decor		plasticizers	
259	Monsey Products Co.	425 Central Ave.	East Rutherford	Paints		Large quantity generator of wastes including PCBs	www.leagle.com/decision/1995625279njsuper3461596; EDR, p. 58330/66158 4319330.2s.pdf
260	Montclair Community Hospital	120 Harrison Ave.	Montclair	Hospital.		TSCA PCB inspection	EDR, p. 3078/51539 4330768.1s-1.pdf
261	Morlot Color & Chemical Co.	111 Ethel Ave.	Hawthorne	Dyes for textile industry. Est. 1965.		dyes	New Jersey Industrial Directory, Hawthorne, 1990.
262	Morningstar Paisley	1153 Bloomfield Ave.	Clifton	Adhesives for the packing industry. (Changed names to Industrial Coatings, Division of International Latex & Chemical Corporation.)		Purchased PCBs	Monsanto PCB Sales Summaries, 1963-1966.
263	Morningstar Paisley		Newark	Adhesives for the packing industry.		Purchased PCBs	Monsanto PCB Sales Summaries, 1963-1965.
264	Morris Paper Board Co.	177 Third Ave.	Paterson	Paperboard and packaging.		adhesives	https://www.nrc.gov/docs/ML0201/ML020150483.pdf; New Jersey Industrial Directory, Paterson, 1960.
265	Motiva Enterprises Newark Terminal #13055 (Star Enterprise)	909 Delancey St.	Newark	Fuel storage/distribution.		Deed restriction (caps/fencing) for onsite contamination including PCBs.	www.motiva.com; EDR, p. 38645/44205 4326287.1s.pdf
266	MSM Properties Corp.	1 Lisbon St.	Clifton	Site is a warehouse built in 1955, recently occupied by HomeCare Industries.		Large quantity generator of wastes including PCBs	www.loopnet.com/Listing/17957527/1_Lisbon-St-Clifton-NJ/; EDR, p. 36943/66158 4319330.2s.pdf
267	National Electric	296 Broadway	Passaic	Electrical distributors.		Purchased PCBs.	Monsanto PCB Sales Summaries, 1970.

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	Company	Street Address	City	Company Information	SIC	Industry Basis/Allegation	URL or Other Source
268	National Machinery Exchange	72 Roanoke Ave., 158 Paris St.	Newark	Used ferrous and nonferrous metalworking equipment.		hydraulic fluids	www.nationalmachy.com
269	New Jersey Galvanizing & Tinning Work	139 Haynes Ave.	Newark	Hot dip galvanizing since 1902.	3479	TSCA PCB inspection	New Jersey Industrial Directory, Newark, 1952/53; EDR, p. 43745/51539 4330768.1s-1.pdf
270	New York Corrugated Box Co.	239 Lindbergh Pl.	Paterson	Corrugated boxes and packing supplies. Est. 1943.		adhesives	businessfinder.silve.com/new-york-corrugated-box-co-paterson-nj-1.html
271	New York Folding Box	129 Christie St.	Newark	Est. 1918. Manufacturer of folding and gift boxes	5999	adhesives	www.nyfoldingbox.com
272	Newark Industrial Spraying	12 Amsterdam St.	Newark	Painting, Spraying & Enameling, Powder Coating, Metal Finishing, and Screen Printing since 1942		paints, coatings	www.newarkindustrialspray.com
273	Newark Land -P19 (WHC Five Real Estate Ltd Partnership)	562-584 Haynes Ave.	Newark			Shipped PCB wastes to landfill	EDR, p. 43699/51539 433078.1s-1.pdf
274	Newark Paraffine Paper Co. (Norpak Corp.)	70 Blanchard Ave.	Newark	Est. 1952. Manufactures paper products and converting services for use in its customers' production, packaging, distribution, and end use operations		inks; TSCA PCB inspection; inks/dye/solvents/waste liquids dumped in rear of facility (1992).	EDR, p. 21637/44205 432687.1s.pdf
275	Newark Public Schools	2 Cedar St.	Newark			TSCA PCB inspection.	EDR, pp. 28039, 31922/51539 4330768.1s-1.pdf
276	Newspring Packaging (Newspring Industrial Corp.)	35 O'Brien St.	Kearny	Food packaging.		TSCA PCB inspection	www.joshen.com/Pactiv/Newspring.pdf; EDR, p. 14252/44205 432687.1s.pdf
277	Nimco Shredding Co.	254 Doremus Ave.	Newark	Shredding service	7389	PCB violation; TSCA PCB inspection.	EDR, pp. 26923, 34333/44205 4326287.1s.pdf
278	NJ Institute of Technology	323 High St.	Newark	School		TSCA PCB inspection (1986).	EDR, p. 5270/66158 4319330.2s.pdf
279	NJ Institute of Technology, Dept. of Physics (Hazardous Substance Management Research Center)	161 Warren St.	Newark	School research center		Enforcement action related to PCBs (1993); TSCA PCB inspection (1998).	EDR, pp. 28467, 28501/51539 4330768.1s-1.pdf
280	NJ Schools Development Auth North Ward Park School (Liberty Optical Manufacturing)	360 - 380 Verona Ave.	Newark	Liberty Optical Manufacturing made optical frames.	3851	Deed restriction (caps) for contamination including PCBs.	PVSC Industrial Inventory, 1987, p. 20; EDR, p. 11486/51539 4330768.1s-1.pdf
281	NJ Transit - Meadows Maint. Complex	5710 Newark-New Jersey City Tnpk., 1148 Newark Tnpk.	Kearny	Bus, light rail, railroad maintenance facility.		lubricants.hydraulic fluids; TSCA PCB inspection/violation found.	EDR, pp. 27561, 27649/44205 4326287.1s.pdf
282	NJ Transit - NWK Central Maint. Facility	1 Penn Plaza E.	Newark	Bus, light rail, commuter rail maintenance facility		Historical generator of PCB wastes	EDR, p. 18151/44205 4326287.1s.pdf
283	NJ Transit Authority/Rail Operations (see also Catholic Community Service)	1160 Raymond Blvd.	Newark	Rail operations.		PCB enforcement actions.	EDR, p.31967/51539 4330768.1s-1.pdf
284	NJ Turpike Authority (see also Bayonne Barrel & Drum)	140-166 Raymond Blvd.	Newark	Drum reconditioning/disposal.		Small quantity generator of PCB wastes	EDR, p. 24460/44205 4326287.1s.pdf
285	Noellier Industries Inc.	400 Maltese Dr.	Totowa			Deed restriction (caps/fence) for wastes including PCBs.	EDR, p. 9773/31947 4330766.1s.pdf
286	Norpak Corp.	70 Blanchard St. and 96-126 Roanoke Ave.	Newark	Paper and packaging		inks, dyes; PCBs found onsite; TSCA PCB inspection	EDR, p. 21637/44205 4326287.1s.pdf
287	North Jersey Skein Dye Co. Inc.	152 Putnam St.	Paterson	AKA Hoof Fe Dye Works. Dyeing of manmade fiber & silk broadwoven fabric.	2269	dyes	New Jersey Industrial Directory, Paterson, 1955; PVSC Industrial Inventory, 1987, p. 24.
288	Nyloc Aerospace (Nylok)	11 Thomas Rd. S	Hawthorne	Founded in 1942. Provider of resin, adhesive and lubricant coatings for threaded fastener applications. Now a Marmon/Berkshire Hathaway Company.	3452	adhesives, coatings, plasticizers	www.nylok.com
289	O.C. Adhesives	125 5th Ave.	Paterson	Adhesive and sealant company. Est. 1962. (May now be part of Spectrachem/A.K. Technologies Inc.)	2891	adhesives, sealants	www.manta.com/c/mmflftk/oc-adhesives-corporation
290	OMG Fidelity, Inc. (OMG Electronic Chemicals LLC, OMG Group Inc.)	470 Frelinghuysen Ave.	Newark	Produces electroplating chemicals and metal concentrates. Formerly known as Auric Corp.		TSCA PCB inspection/violations found.	EDR, p. 43570/51539 4330768.1s-1.pdf
291	O'Neil Color & Compounding Corp.	61 River Dr.	Garfield	NKA Primex. Colorants and compounds for a variety of plastics		TSCA PCB inspection	EDR, p. 44924/66158 4319330.2s.pdf
292	Orient Chemical Corp.	121 Tyler St.	Newark	Manufacturer of Nigrosine Dye. Moved facilities to Seaford, DE in 1991.	2269	dyes	PVSC Industrial Inventory, 1987, p. 25.
293	Owens Corning	1249 Newark-Jersey City Tnpk.	Kearny	Insulation and roofing materials. Company founded in 1930s.	2952	insulation, building materials, caulk/joint sealant; purchased PCBs	Monsanto PCB Sales Summaries, 1968.
294	Pacquet Oneida	10 Clifton Blvd.	Clifton	Coated and laminated paper. (Bought by Lawson-Mardon, 1998.)		adhesives, coatings	http://www.usa.com/frs/pacquet-oneida-inc.html; https://www.plasticsnews.com/article/19980713/NEWS/307139973/lawson-mardon-buys-pacquet
295	Paisley Pro-Div.		Clifton			Purchased PCBs	Monsanto PCB Sales Summaries, 1967-1970.
296	Pan Chemical	1 Washington Ave.	Hawthorne	Manufacture of industrial coatings, color dispersions, inks and nail polish. Est. 1940s.		coatings, dyes, inks; leaking underground storage tanks contaminated property	caselaw.findlaw.com/nj-superior-court-appellate-division/1486966.html
297	Pantasote (Panasote Co., Panasote Leather Co., and Pantasote Polymers, Inc.)	126 Jefferson St.	Passaic	Plastics manufacturer.	2821	plasticizers, coatings; PCB violations	PVSC Industrial Inventory, 1987, p. 26; EDR, p. 41001/66158 4319330.2s.pdf
298	Paperboard Specialist, Inc.	177 3rd. Ave.	Paterson	Paperboard		PCB transformer area of concern onsite	EDR, p. 7119/66158 4319330.2s.pdf
299	Paragon Household Products, Inc.	233 Clifton Blvd.	Clifton	Deoderants.		TSCA PCB inspection	www.manta.com/c/mm59tqy/paragon-household-products-inc; EDR p. 36355/66158 4319330.2s.pdf
300	Pass Recovery Systems	1500 Main Ave.	Clifton	Battery/lead recycler.		Shipped PCB oil offsite.	EDR, p. 24341/66158 4319330.2s.pdf
301	Passaic Engraving Co.	41 Brook St.	Passaic	commercial printer	2759	TSCA PCB inspection	EDR, p. 54628/66158 4319330.2s.pdf
302	Passaic Valley Sewerage Commission (PVSC)	600 Wilson Ave.	Newark	Sewage treatment.		Historical large quantity generator of wastes including PCBs. Shipped PCB wastes to incinerator and landfill (1985).	EDR, pp. 37530, 37534/44205 4326287.1s.pdf

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	Company	Street Address	City	Company Information	SIC	Industry Basis/Allegation	URL or Other Source
303	Paterson Housing Authority - Brooks-Sloate Development	9 Christina Pl.	Paterson			Historical small quantity generator of wastes including PCBs.	EDR, p. 5758/31947 4330766.1s.pdf
304	Paterson Public Schools - International HS/Don Bosco Tech	202 Union Ave.	Paterson			TSCA PCB inspection	EDR, p. 12456/31947 4330766.1s.pdf
305	Paterson Rubber Co.	104 North 2nd St.	Paterson	Tank and barrel lining.		plasticizers, rubber, coatings	New Jersey Industrial Directories, Paterson, 1965, 1970, and 1975.
306	Paul Dyeing Co.	One Main St.	East Orange	Est. 1934. Dyeing cotton broadwoven fabrics.	2258	dyes	PVSC Industrial Inventory, 1987, p. 26.
307	Paxall Circle Machinery	161 Harrison Rd.	Glen Rock	Packaging machinery.		Large quantity generator of PCB wastes.	New Jersey Industrial Directory, Glen Rock, 1985; EDR, p. 4617/66158 4319930.2s.pdf
308	Peerless Tube Co.	58-76 Locust Ave.	Bloomfield	Manufactured metal tubes and aluminum aerosol containers.	3496	TSCA PCB inspection/violations found.	PVSC Industrial Inventory, 1987, p. 26; EDR, 9181/51539 4319330.2s.pdf
309	Penn Color	30 Paul Kohner Pl.	Elmwood Park	Formerly Custom Colors. Manufactures pigment dispersions for the ink and coatings industry.		dyes, inks, coatings	www.penncolor.com
310	Penn-Jersey Paint & Varnish	304 Ogden St.	Newark	Paints, varnishes, enamels.	2842	paints; purchased PCBs	Monsanto PCB Sales Summaries, 1969; New Jersey Industrial Directory, 1952/53, p. 619.
311	Permanent Label	801 Bloomfield Ave.	Clifton	Decorating and printing labels for plastic products.	3069	inks, adhesives	www.usa.com/frs/permanent-label-corp-110001528703.html
312	Pershing Rubber Roller Co.	135 Orange St.	Bloomfield	Rubber rolls, solids, or covered rubber.	8999	rubber	www.manta.com/c/mm2mhxm/pershing-rubber-roller-corporation
313	Petri Paint Co. Inc.	198 Pacific St.	Newark	Manufactures varnish, stains, powder coat, glazes, lusters, lacquers, sealers, shellacs, and miscellaneous finishes. Est. 1962.		paints, coatings, sealants	https://www.macraesbluebook.com/search/company.cfm?company=506397
314	Peugeot Motors of America Inc.	1 Peugeot Plaza	Lyndhurst	Former U.S. headquarters for Peugeot America.		Large quantity generator of wastes including PCBs	apnews.com/1e7227688aede9a13140684544221324; EDR, p. 4183/44205 432687.1s.pdf
315	PH Buildings	130 8th St.	Passaic City	Brownfield.		Deed restriction (asphalt/foundations) to control PCBs	EDR, p. 41856/66158 4319330.2s.pdf
316	Plectone Corporation of America	2141 McCarter Hwy.	Newark	Paint manufacturer. Part of Maas & Waldstein.	2851	paints; Maas & Waldstein purchased PCBs	Monsanto PCB Sales Summaries, 1964-1971; 1974 New Jersey State Industrial Directory, p. G-161.
317	PMC Inc., Dura-Bond Division	1875 McCarter Hwy.	Newark			Large quantity generator of wastes including PCBs	EDR, p. 11881/44205 4326287.1s.pdf
318	Podell Industries	296 Midland Ave.	Garfield	clothing manufacture		dyes; discharged dye to Schroeders Brook from floor drains (1969).	PVSC, Pollutions Corrected During 1969, March 31, 1970, p. 8.
319	Pope Chemical Co.	33 Sixth Ave.	Paterson	Paste pigment and vehicles for printing inks. Became part of Daicolor-Pope in 1987.	2893	inks, coatings	New Jersey Industrial Directory, 1955; PVSC Industrial Inventory, 1987, p. 27.
320	Popola Drum & Barrel	228 Lyons Ave.	Newark	AKA Thomas Popola & Sons. New and reconditioned drums. Est. 1963.	3412	drum reconditioning	https://www.manta.com/c/mmc50yl/thomas-popola-sons-inc
321	Port Authority of NY & NJ - Metcalf & Eddy	141 Suez & Marsh St.	Port Newark			Historical large quantity generator of wastes including PCBs	EDR, p. 42946/44205 4326287.1s.pdf
322	Pratt Gabriel (B.G. Pratt Company, Miller Chemical and Fertilizer Company)	204 21st St.	Paterson	Insecticides, fungicides, herbicides.		State-lead cleanup of site. Found dioxin and PCBs.	EDR, p. 14173/66158 4319330.2s.pdf
323	Precision Manufacturing Group, LLC	82 Industrial St. E.	Clifton	dba Servometer LLC. Electrodeposited metal bellows, flexible shaft couplings, electrical contacts, and rigid electroforms. Est. 1962.		cutting oils, lubricants	servometer.com/about-us/history/
324	Prudential Insurance Co.	153 Halsey St.	Newark			TSCA PCB inspection/violations found.	EDR, p. 28107/51539 4330768.1s-1.pdf
325	Prudential Insurance Co.	Two Gateway Center, McCarter Hwy.	Newark			Large quantity generator of PCB wastes.	EDR, p. 32043/51539 4330768.1s-1.pdf
326	Pyrolac Corp.	55 Schoon Ave.	Hawthorne	Produced primers, lacquers, enamels, coatings, solvent reducers, and cleaners. Prior owners were Fair Lawn Finishing Company (1940-1946), New Jersey Lacquer Company (1947-1966), and Vulcan Lacquer & Coatings (1966), which changed its name to Pyrolac Corporation in 1967.		paints; PCBs found onsite; purchased PCBs	Dewberry-Goodkind, Preliminary Assessment Report: Former Pyrolac Corporation Facility, November 2009; Monsanto PCB Sales Summaries, 1968.
327	Quality Machine Company Inc.	183 Autumn St.	Passaic	Fabricated metal products by forging, stamping, bending, forming, welding, machining, and assembly.		TSCA PCB inspection; hydraulic fluids, lubricants	www.bloomberg.com/profile/company/1043768D:US EDR, p. 40774/66158 4319330.2s.pdf
328	R & R Dyeing, L.L.C.	3 E. 26th St.	Paterson	Dyeing		dyes	www.nj.gov/dep/bulletin/bu2004_1006.pdf
329	Radial Casting Corp.	70 Pennsylvania Ave.	Kearny	brass foundry and aluminum diecasting		TSCA PCB inspection	EDR, p. 28038/44205 432687.1s.pdf
330	Radio Station WEVD (Forward Assn Inc.)	Rte. 3W & 120N (Intersection of)	East Rutherford	Radio transmission station.		Small quantity generator of PCB wastes	EDR, p. 5608/44205 432687.1s.pdf
331	Radio Station WPAT	1396 Broad St.	Clifton	Radio transmission station.		Large quantity generator of PCB wastes.	EDR, pp. 25444, 26096/31947 4330766.1s.pdf
332	Rainbow Dye & Finishing, Inc. (Rainbow Piece Dye Works, Inc.)	20-21 Wagawar Rd. #31B	Fair Lawn	Dyeing and finishing of textiles.	2261	dyes	New Jersey Industrial Directory, Fair Lawn, 1982; PVSC Industrial Inventory, 1987, p. 28.
333	Raybestos-Manhattan, Inc.	Willet St.	Passaic	Fabricated rubber products.		rubber; purchased PCBs	New Jersey Industrial Directory, Passaic, 1974; Monsanto PCB Sales Summaries, 1967 and 1969.
334	RCR Management LLC Property	Summer St. Lot & Central	Passaic			Multiple shipments of PCB wastes to landfill.	EDR, p. 40219/66158 4319330.2s.pdf
335	Reardon Corp. (Reardon Company)		South Kearny	Paints.		paints; Purchased PCBs	Monsanto Sales Summaries, 1958-1959.
336	Refined Prod DV	624 Schuyler Ave.	Lyndhurst	Detergents and finishing compounds (including mildewproofing compounds) for the textile industry.		coatings; purchased PCBs	New Jersey Industrial Directory, Lyndhurst, 1952/53; Monsanto PCB Sales Summaries, 1971.
337	Rempac Foam Corp.	61 Kuller Rd.	Clifton	Flexible foam plastic products.	3086	TSCA PCB inspection/violations found.	EDR, p. 22486/31947 4330287.1s.pdf
338	Renco Finishing Corp.	20-21 Wagawar Rd. #31B	Fair Lawn	Dyeing cotton broadwoven fabric; manmade, fiber & silk textile finishing plant	2261	dyes	PVSC Industrial Inventory, 1987, p. 28.
339	Research Organics Inorganics	507 Main St.	Belleville Township	Specialty chemicals (1972-1983).		Multiple shipments of PCB wastes to landfill.	EDR, p. 8140/44205 432687.1s.pdf
340	Reusche & Co. (L. Reusche & Company, TWS Inc.)	2 Lister Ave.	Newark	Paints, varnishes, pigments.	2816	paints; TSCA PCB inspection/violations found (disposal)	https://iaspub.epa.gov/enviro/fil_query_detail.disp_prog m_facility?p_registry_id=110002090781; EDR, p. 21530/44205 4326287.1s.pdf

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	Company	Street Address	City	Company Information	SIC	Industry Basis/Allegation	URL or Other Source
341	Riverside Ford	144 Passaic Ave.	Kearny	Automobile repair.		Historical large quantity generator of wastes including PCBs	EDR, p. 12793/66158 4326287.1s.pdf
342	Rochelle Park Velvet, Co.*	Main St.	Lodi	Dyeing and finishing of velvet. Est. 1896.		dyes	Industrial Directory of New Jersey, 1912, p. 258.
343	Rockwell Standard		Newark			Purchased PCBs	Monsanto PCB Sales Summaries, 1959.
344	Rollins Environmental Services FS Inc. (Scientific Chemical Processing Inc.)	411 Wilson Ave.	Newark	Scientific Chemical Processing main office. Collection/processing/recycling of hazardous wastes.		Historical large quantity generator of wastes including PCBs	Hazardous Waste Management Facilities in the United States, 1977, p. 27; EDR, p. 36407/44205 432687.1s.pdf
345	Roman Adhesives, Inc.	5 Lawrence St.	Bloomfield	Manufactured the adhesive used in the installation of the vinyl wallcovering.		adhesives	http://query.nytimes.com/gst/fullpage.html?res=9C07E5DD163AF936A25757C0A9669D8B63
346	Ronald Mark Associates Inc. (DME Co.)	1217 Central Ave.	Hillside Township			Deed restriction (caps, fence, signage) for contamination including PCBs.	EDR, p. 47093/51539 4330768.1s-1.pdf
347	Ronson Metals Corp.	55 Manufacturers Pl.	Newark	Cigarette lighters and related products	3356	Purchased PCBs	Monsanto PCB Sales Summaries, 1968-1973; 1974 New Jersey State Industrial Directory, p. G-163.
348	Rose Color Inc.	170 Blanchard St.	Newark	Manufactures dyes, pigments, and chemicals for the petroleum and plastics industries. May now be owned by International Imaging.		TSCA PCB inspection	Nextech Enterprises International Inc., 8-K/A [Amend] - Current Report, 1997; EDR, p. 20457/44205 4326287.1s.pdf
349	Royal Aluminum	600 Cortlandt St., 218 Jefferson St.	Newark	Est. 1957. Window manufacturer.	3442	adhesives, caulks	1974 New Jersey State Industrial Directory, p. G-163.
350	Royal Lite Mfg. Corp.	43 Montgomery St.	Belleville	Lighting.		Historical generator of PCB wastes	EDR, p. 8135/51539 4330768.1s-1.pdf
351	R.P. Cargille (Cargille Labs, Cargille & Sons, Cargill-Sacher Laboratories, Cargille Scientific)	55 Commerce Rd, 33 Village Park Rd.	Cedar Grove	Optical products. Located on Peckman River (tributary to Passaic River) which is impaired by PCBs measured in fish tissues. (Also has addresses at 194 Second Ave. and 9 Railroad Ave. in Little Falls, NJ.)		Purchased PCBs; optical fluids with PCBs; PCBs in site soils	www.cargille.com; Monsanto Sales Summaries, 1968-1970; New Jersey Industrial Directories, 1960/61, 1964, and 1974; Cargille letter to NJDEP, July 14, 2016.
352	Rubber & Silicone Products Co.	17 Montesano Rd.	Fairfield/West Caldwell	Est. 1954. Molded rubber products.		rubber; purchased PCBs	Monsanto PCB Sales Summaries, 1968 and 1970; www.manta.com/c/mmbp0nz/rubber-silicone-products-co-inc
353	Rutgers University - Newark Campus	360 Martin Luther King, Jr. Blvd.	Newark	School.		Historical large quantity generator of wastes including PCBs	EDR, p. 28753/51539 4330768.1s-1.pdf
354	Samuel Schmidt Chemical Co.		Newark			Purchased PCBs	Monsanto PCB Sales Summaries, 1968.
355	Sandvik Steel	17-02 Nevin Rd.	Fair Lawn	Hand tools.		Purchased PCBs	Monsanto PCB Sales Summaries, 1970-1971; New Jersey Industrial Directory, 1960, 1965, and 1970.
356	Sanitrol Chemical	302 Jelliff Ave.	Newark	Adhesives. Est. 1970.		adhesives	www.usbizs.com/NJ/Newark/Sanitrol_Chemical_Co_Inc_6RI.html
357	Scher Chemicals, Inc.	1 Industrial Way & Styertowne Rd.	Clifton	Detergents and industrial chemical specialties.	2869	TSCA PCB inspection	PVSC Industrial Inventory, 1987, p. 30; EDR, p. 50835/66158 4319330.2s.pdf
358	Sealed Air Corp.	19-01 State Hwy. 208	Fair Lawn	Air cellular cushioning products; plastic foam packaging products.	3086	adhesives, coatings, heat exchanger fluids	New Jersey Industrial Directory, Fair Lawn, 1975.
359	Seidler Chemical & Supply Co., Inc.	537 Raymond Blvd.	Newark	Supplier, distributor, blender and re-packager of chemicals and ingredients.		TSCA PCB inspection/violations found.	EDR, p. 24915/51539 4330768.1s.pdf
360	Shell Oil Co (Motiva Enterprises LLC)	368 Franklin Ave.	Belleville	Gas station.		Small quantity generator of PCB wastes	EDR, p. 4485/51539 4330768.1s-1.pdf
361	Shell Oil Co. (Motiva Enterprises LLC)	10 18th Ave.	Paterson	Gas station.		Small quantity generator of PCB wastes	EDR, p. 14149/66158 4319330.2s.pdf
362	Shell Oil Co. (Motiva Enterprises LLC)	111 Franklin St.	Bloomfield	Gas station.		Small quantity generator of PCB wastes	EDR, p. 9020/51539 4330768.1s-1.pdf
363	Shell Oil Co. (Motiva Enterprises LLC)	115 Bloomfield Ave.	Montclair	Gas station.		Small quantity generator of PCB wastes	EDR, p. 2769/51539 4330768.1s-1.pdf
364	Shell Oil Co. (Motiva Enterprises LLC)	1434 McCarter Hwy.	Newark	Gas station.		Small quantity generator of PCB wastes	EDR, p. 20496/51539 4330768.1s-1.pdf
365	Shell Oil Co. (Motiva Enterprises LLC)	165 Paterson Ave.	Wallington	Gas station.		Small quantity generator of PCB wastes	EDR, p. 43270/66158 4319330.2s.pdf
366	Shell Oil Co. (Motiva Enterprises LLC)	180 Central Ave.	East Orange	Gas station.		Small quantity generator of PCB wastes	EDR, p. 16152/51539 4330768.1s-1.pdf
367	Shell Oil Co. (Motiva Enterprises LLC)	2 Ridge Rd.	Lyndhurst	Gas station.		Small quantity generator of PCB wastes	EDR, pp. 56300, 60680/66158 4319330.2s.pdf
368	Shell Oil Co. (Motiva Enterprises LLC)	205 Darling	Nutley	Gas station.		Small quantity generator of PCB wastes	EDR, p. 51525/66158 4319330.2s.pdf
369	Shell Oil Co. (Motiva Enterprises LLC)	211 Watchung Ave.	Bloomfield	Gas station.		Small quantity generator of PCB wastes	EDR, pp. 29788, 30429/31947 4330766.1s.pdf
370	Shell Oil Co. (Motiva Enterprises LLC)	214 High Mountain Rd.	Haledon	Gas station.		Small quantity generator of PCB wastes	EDR, pp. 2729, 4167/31947 4330766.1s.pdf
371	Shell Oil Co. (Motiva Enterprises LLC)	268-274 Heller Pkwy.	Newark	Gas station.		Small quantity generator of PCB wastes	EDR, p. 10401/51539 4330768.1s-1.pdf
372	Shell Oil Co. (Motiva Enterprises LLC)	299 Rte. 3 Eastbound	Clifton	Gas station.		Small quantity generator of PCB wastes	EDR, p. 56213/66158 4319330.2s.pdf
373	Shell Oil Co. (Motiva Enterprises LLC)	300 Rte. 3 Westbound	Clifton	Gas station.		Small quantity generator of PCB wastes	EDR, p. 56204/66158 4319330.2s.pdf
374	Shell Oil Co. (Motiva Enterprises LLC)	496 Central Ave.	Orange	Gas station.		Small quantity generator of PCB wastes	EDR, p. 12180/51539 4330768.1s-1.pdf
375	Shell Oil Co. (Motiva Enterprises LLC)	499 Paget Ave. & Rte. 46 EB	Clifton	Gas station.		Small quantity generator of PCB wastes	EDR, p. 25038/66158 4319330.2s.pdf
376	Shell Oil Co. (Motiva Enterprises LLC)	526 Bloomfield Ave. & 12th	Newark	Gas station.		Small quantity generator of PCB wastes	EDR, pp. 10901, 17285/51539 4330768.1s-1.pdf
377	Shell Oil Co. (Motiva Enterprises LLC)	528 Main St.	Orange	Gas station.		Small quantity generator of PCB wastes	EDR, pp. 4877, 7045/51539 4330768.1s-1.pdf
378	Shell Oil Co. (Motiva Enterprises LLC)	725 - 735 S. Orange Ave.	Newark	Gas station.		Small quantity generator of PCB wastes	EDR, p. 24074/51539 4330768.1s-1.pdf
379	Shell Oil Co. (Motiva Enterprises LLC)	735 Belleville Ave.	Belleville	Gas station.		Small quantity generator of PCB wastes	EDR, p. 7838/51539 4330768.1s-1.pdf
380	Shell Oil Co. (Motiva Enterprises LLC)	74 E Passaic Ave.	Nutley	Gas station.		Small quantity generator of PCB wastes	EDR, p. 1220/44205 4326287.1s.pdf
381	Shell Oil Co. (Motiva Enterprises LLC)	81 1st. Ave.	Paterson	Gas station.		Small quantity generator of PCB wastes	EDR, p. 6786/66158 4319330.2s.pdf
382	Shell Oil Co. (Motiva Enterprises LLC)	902 Goffie Rd. & Watchung	Hawthorne	Gas station.		Small quantity generator of PCB wastes	EDR, p. 3747/66158 4319330.2s.pdf
383	Shell Oil Co. (Motiva Enterprises LLC)	92 Lafayette & Wagaraw	Hawthorne	Gas station.		Small quantity generator of PCB wastes	EDR, p. 6632/66158 4319330.2s.pdf
384	Shell Oil Co. (Motiva Enterprises LLC)	99 - 111 Midland & River	Garfield	Gas station.		Small quantity generator of PCB wastes	EDR, pp. 41307, 44887/66158 4319330.2s.pdf
385	Shell Oil Co. (Motiva Enterprises LLC)	Rte. 23 & 2nd St.	Little Falls	Gas station.		Small quantity generator of PCB wastes	EDR, pp. 17370, 19495/31947 4330766.1s.pdf

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	Company	Street Address	City	Company Information	SIC	Industry Basis/Allegation	URL or Other Source
386	Shell Oil Co. (Motiva Enterprises LLC)	Rte. 46 WB	West Paterson	Gas station.		Large quantity generator wastes including PCBs	EDR, pp. 22050, 22052/31947 4330766.1s.pdf
387	Shell Oil Co. Motiva Enterprises LLC (Montclair State University/MSU Parking Garage)	100 Clove Rd.	Little Falls	Gas station.		Small quantity generator of PCB wastes	EDR, pp. 22261, 24690/31947 4330766.1s.pdf
388	Sher Plastics Co., Inc.	90 Dayton Ave.	Passaic	Plastic fabrications including buttons, hardware, embellishments, lables, hangtags, and packaging. Est. 1942.		plasticizers	www.sherplastics.net
389	Signature Cloth Company, Inc.	200 Clifton Blvd.	Clifton	Textile finishing.		coatings; TSCA PCB inspection	PVSC Industrial Inventory, 1987, p. 30; EDR, p. 36428/66158 4319330.2s.pdf
390	Sika Corp.	201 Polito Ave., 875 Valleybrook Ave.	Lyndhurst	Waterproofing compounds, sealants, adhesives. Est. 1937.		adhesives, sealants; TSCA PCB inspection/violations found.	New Jersey Industrial Directory, Lyndhurst, 1973; usa.sika.com; EDR, p. 4612/44205 4326287.1s.pdf
391	Silva & Son	139 Ave. L	Newark	Metal working.	5051	coatings	us-business.info/directory/newark-nj/part58/
392	Sims Metal Management	Hawkins St.	Newark	Processes scrap metal and electronics.		Electronics recycling; multiple shipments of PCB wastes to landfill.	www.simsmm.com; EDR, p. 24884/44205 432687.1s.pdf
393	Singer Kearfott (Kearfott Corporation)	165 Lackawanna Ave., 1225 McBride Ave.	West Paterson	Defense equipment manufacturer including guidance and navigation systems. Currently located at 1150 McBride Ave., Little Falls/Woodland Park, NJ.		lubricants, adhesives, coatings, paints, heat transfer fluids	www.kearfott.com
394	Social Security Bldg.	44 - 66 Van Houten Ave.	Paterson	Office building. (Prior industrial operations include Paterson Carbonic Gas and Paterson Hat.)		Soil samples show high levels of PCBs.	EDR, p. 15032/31947 4330766.1s.pdf
395	Solid Waste Transfer & Recycling Inc.	540 Doremus Ave., 442 Frelinghuysen Ave.	Newark	Garbage: collecting, destroying, and processing business.		waste handling	https://www.bloomberg.com/profile/company/0956193D:US
396	Sommers Plastic Product Co. Inc.	835 Bloomfield Ave.	Clifton	Synthetic leather/fur. Est. 1947.	3081	plasticizers, coatings; dyes	www.sommers.com
397	Sonneborn Co. (Sonneborn Build, L. Sonneborn Sons)	Hancox Ave.	Belleville	Petroleum products, lubricants, oil, waxes.		Purchased large amounts of PCBs	Monsanto PCB Sales Summaries, 1968-1971.
398	Sovereign Chem	1225 W. Market St.	Paterson			Purchased PCBs	Monsanto PCB Sales Summaries, 1971.
399	Spectrachem - Div. of AK Technologies	10 Dell Glen Ave.	Lodi	Textile printing inks, pigment dispersions, specialty adhesives.		inks, dyes	www.spectrachem.net
400	Spectrachem Corp.	200 Sheridan Ave.	Paterson	Textile printing inks/pigment dispersions.		inks, dyes; Purchased PCBs	PVSC Industrial Inventory, 1987, p. 31; Monsanto PCB Sales Summaries, 1970.
401	St. Joseph's Regional Medical Center (St. Joseph's Hospital)	703 Main St.	Paterson	Hospital.	8062	TSCA PCB inspection/ violations found.	EDR, pp. 16028, 16044/31947 4330766.1s.pdf
402	St. Mary School	95 Sherman Ave.	Paterson	School.		TSCA PCB inspection.	EDR, p. 12016/31947 4330766.1s.pdf
403	Standard Chlorine Chemical Co. Inc.	1035 Belleville Tnpk.	Kearny	From 1916-1993 production, storage and packaging of moth balls and flakes, manufacture of lead-acid batteries, formulation of drain cleaners, production of dye carriers, and distillation and purification of chlorinated benzenes. Listed on NPL 2007.		PCBs found onsite	EDR, pp. 5828, 7580, 7582, 28140/44205 4326287.1s.pdf
404	Standard Tallow Corp. (B&L Oil Corp., Vineland Construction Co.)	1215 Harrison Ave.	Kearny	Animal and marine fats and oils.	2077	Large quantity generator of wastes including PCBs; shipped PCB wastes to landfill.	www.usa.com/frs/the-standard-tallow-corporation.html; EDR, pp. 15731, 19510/44205 4326287.1s.pdf
405	Star Warehouse	90-110 Maltese Dr.	Totowa	Warehouse. (May be related to Star Stainless Screw Co.)		Deed restriction (caps, lining, soil) for wastes including PCBs.	EDR, pp. 9678, 11083/31947 4330766.1s.pdf
406	Star-Glow Rubber (Star Glo Rubber Manufacturing)	2 Carlton Ave.	East Rutherford	Est. 1950. Swiss screw machining, rubber, and rubber-to-metal components and assemblies.		rubber, plasticizers; purchased PCBs	Monsanto PCB Sales Summaries, 1970; www.starglo.com/company
407	Steel Craft Industries, Inc. (Steel Craft Fluorescent & Stamping Co.)	191 Murray St.	Newark	Est. 1946. Metal stampings, paint spraying, fluorescent fixture bodies and accessories.		light ballasts, paints, hydraulic fluids	New Jersey Industrial Directory, 1952/53, p. 626; "Steel Craft Industries Unveils High-Tech Production Capabilities," NJMEP, April 2, 2013.
408	Stevens Products Inc.	201 4th St., 128 N. Park St.	East Orange	Electric/electronic insulation materials and thermoset tubing. In business over 70 years.	5063	Electrical insulation	www.stevensproducts.net
409	Strauss Plastic Co.	111 Gotthart St.	Newark	Custom injection molding of thermoplastic resins, ultrasonic welding, and mechanical assemblies.		plasticizers; heat transfer fluids; lubricants	Department of Defense, Minority Business Directory, September 1978, p. 50.
410	Sunrise Industries Inc.	465 Hillside Ave.	Hillside			Deed restriction (caps, soil, fence) for contamination including PCBs.	EDR, pp. 35570, 39619/51539 4330768.1s-1.pdf
411	Superior Cloth Co. Inc. (may be related to Signature Cloth)	200 Clifton Blvd.	Clifton			TSCA PCB inspection.	EDR, p. 36428/66158 4319330.2s.pdf
412	Survivor Technology, Inc.	1441 Chestnut Ave.	Hillside			TSCA PCB inspection/ violations found; shipped PCB oils to landfill.	EDR, p. 39192/51539 4330768.1s-1.pdf
413	Sybron Chemicals Inc. (Caribe International)	255 Belmont Ave.	Haledon	Polymers and specialty chemicals.		Shipped PCB wastes to landfill	EDR, p. 5281/31947 4330766.1s.pdf
414	Syncon Resins Inc.	77 Jacobus Ave.	Kearny	Manufactured paints, varnishes and resins. Added to NPL in 1983. PCBs were a major contaminant.		PCBs found onsite.	EDR, pp. 19309, 27151/44205 4326287.1s.pdf
415	Talon Adhesives	160 Passaic Ave.	Kearny	Adhesives, cements, and film adhesives.		adhesives; Purchased PCBs	Monsanto PCB Sales Summaries, 1966, 1968, and 1970; New Jersey Industrial Directory, Kearny, 1974.
416	Technical Rubber & Plastic	180 Getty Ave.	Clifton	Est. 1955. Manufactured rubber and plastic products.	5085	rubber, plasticizers, gaskets; purchased PCBs	Monsanto PCB Sales Summaries, 1970; New Jersey Industrial Directory, Clifton, 1970.
417	Technical Processing Inc.	81 Dale Ave., 106 Railroad Ave.	Paterson	Instruments used in rubber processing.		hydraulic fluids; heat transfer fluids.	New Jersey Industrial Directory, Paterson, 1955.
418	Temperature Processing Co.	228 River Rd.	North Arlington	Est. 1956. Heat treating.	3398	heat exchange fluids	New Jersey Industrial Directory, North Arlington, 1974.
419	Tenax Finishing Products Co.	390 Adams St.	Newark	Industrial coatings, lacquers, synthetics.	2851	coatings; TSCA PCB inspection; PCB manifesting violation	1974 New Jersey State Industrial Directory, p. G-165; EDR, p. 33060/44205 4326287.1s.pdf
420	Tex-Chem	20 Wagaraw Rd.	Fairlawn	Intermediate dyes; color lakes.		dyes; Purchased PCBs	Monsanto PCB Sales Summaries, 1962; New Jersey Industrial Directories, Fairlawn, 1960 and 1975.
421	Titan Adhesives	25 Lake St.	Paterson	Water based, hot melt adhesives	2891	adhesives	New Jersey Industrial Directory, Paterson,
422	Toch Bros.		Kearny	Protective coatings and compounds.		paints, coatings; purchased PCBs	Monsanto PCB Sales Summaries, 1962.
423	Toch Bros.	250 Vreeland Ave.	Paterson	Protective coatings and compounds.		paints, coatings; purchased PCBs	Monsanto PCB Sales Summaries, 1962-1963 New Jersey Industrial Directory, Paterson, 1965.

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	Company	Street Address	City	Company Information	SIC	Industry Basis/Allegation	URL or Other Source
424	Tomkins Tidewater Terminal	1 Jacobus Ave.	South Kearny			Historical large quantity generator of PCB wastes.	EDR, p. 30012/44205 4326287.1s.pdf
425	Tony Pallet Inc.	338 Wilson Ave.	Newark	Wood pallet recycling.		Multiple shipments of PCB wastes to landfill.	C.A. Boyles, "N.J. Recycler Seeks a Greener, Profitable Future: Tony Pallet Uses Trace Equipment to Pursue a Green Mission, Pallet Enterprise, August 1, 2008; EDR, p. 35606/44205 4326287.1s.pdf
426	Transco Pipeline	E. Rutherford Metering Station, Block 107A Lot 59F	East Rutherford	Pipeline.		PCBs and mercury reported spilled from historical discharge.	EDR, pp. 5537, 17928/44205 4326287.1s.pdf
427	Transformer Lab Services Inc. (may be part of G&S Motor Equipment)	1800 Harrison Ave.	Kearny	Transformers.		transformers; Historical small quantity generator of wastes including PCBs; TSCA PCB inspection/ violation found.	EDR, pp. 27470, 27485/44205 4326287.1s.pdf
428	Trio Dyeing & Finishing Co. Inc.	440 E. 22nd St.	Paterson	Dye and finish textile goods.	2261	dyes	PVSC Industrial Inventory, 1987, p. 34.
429	U.S. Rubber	Market St. & Passaic St.	Passaic	Rubber goods		rubber; purchased PCBs	Monsanto PCB Sales Summaries, 1962-1964; New Jersey Industrial Directory, Passaic, 1952/53.
430	Unimatic Manufacturing Corp.	25 Sherwood Ave.	Fairfield	Die casting facility. PCB contamination found inside the building and outside in soil and groundwater. NPL site.		onsite soil contamination in building, soils, and groundwater	EDR, p. 17759/31947 4330766.1s.pdf
431	Union Camp Corp., Folding Carton Div.	800 State Hwy. 3	Clifton	Box paper/carton plant.		adhesives	https://www.homefacts.com/environmentalhazards/New-Jersey/Passaic-County/Clifton/Polluter-Union-Camp-Corp-Folding-Carton-Div-07012nncmp800st.html
432	United Airlines, Inc.	Hangar 14 Newark Airport	Newark	Airline.		Purchased PCBs	Monsanto PCB Sales Summaries, 1966 and 1970.
433	United Label	65 Chambers St.	Newark	Est. 1965. Manufacturers custom printed pressure sensitive labels for commercial use.	2269	adhesives	1974 New Jersey State Industrial Directory, p. G-166.
434	United States Box Corp.	1296 Mccarter Hwy.	Newark	Paperboard boxes, corrugated boxes, acetate containers, plastic boxes.	2653	adhesives	1974 New Jersey State Industrial Directory, p. G-166.
435	United Tool & Stamping Co. Inc.	6 Andrews Dr.	West Paterson/ Woodland Park	Est. 1950. Metal stamping.		hydraulic fluids; lubricants	www.manta.com/c/mmbqfcf/contact-united-tool-stamping-co
436	United Wool Piece Dye & Finishing (United Wool Dyeing and United Wool Piece Dye)	1 Canal St. and 8th Ave.	Passaic	Dyeing and finishing textiles.		dyes	New Jersey Industrial Directory, Passaic, 1952/53 and 1974.
437	Universal Bonding & Processing Corp.	400 Maltese Dr.	Totowa	Adhesives; bonding of fabrics.		adhesives; Purchased PCBs	Monsanto PCB Sales Summaries, 1968.
438	Universal Manufacturing Corp. (Magnetek Universal Manufacturing)	11 Jackson Road	Totowa	Formerly Universal Manufacturing Inc. Manufactured fluorescent transformers, capacitors, and ballasts during 1947-1989.		Purchased large amounts of PCBs	Monsanto PCB Sales Summaries, 1971-1975.
439	Universal Manufacturing Corp. (Magnetek Universal Manufacturing)	29-51 East 6th St.	Paterson	Formerly Universal Manufacturing Inc. Manufactured fluorescent transformers, capacitors, and ballasts during 1947-1989.	3351	light ballasts, transformers, capacitors; purchased PCBs at nearby Totowa facility	New Jersey Industrial Directory, 1960/61, p. B-419; New Jersey State Industrial Directory, 1970, p. G-361; New Jersey State Industrial Directory, 1980, p. G-367; Monsanto PCB Sales Summaries, 1971-1975.
440	Universal Pigments	352 Doremus Ave.	Newark	Color pigments.		dyes	New Jersey Industrial Directory, 1952/53, p. 629.
441	Upsala College	339 Prospect St.	East Orange	School.		TSCA PCB inspection/violations found.	EDR, p. 7393/51539 4330768.1s-1.pdf
442	US Veterans Admin Medical Center (NJ Health Care System, East Orange)	Tremont Ave.	East Orange	Medical center.		Small quantity generator of PCB wastes	EDR, p. 16827/51539 4330768.1s-1.pdf
443	USCG	Last Rd. on Right Next to Bridge Bradford Arms & Grove	Cedar Grove			4/7/1997: "Suspected PCB contamination in area. Buildings used to store material for Gulf War. Dead animals around & warning signs posted."	EDR, pp. 23460, 24553/31947 4330766.1s.pdf
444	V. Ottilio & Sons, Inc.	Ottilio Landfill Site	Newark	Landfill and junk yard.	1794	PCBs found onsite	SMC Environmental Services Group, Revised Final Remedial Investigation Report, Ottilio Landfill, Newark, NJ, Volume 1, September 15, 1995.
445	Van Ness Plastic Molding Co.	400 Brighton Ave., 11 Railroad Pl.	Belleville	Est. 1945. Plastic pet products.	3089	plasticizers	PVSC Industrial Inventory, 1987, p. 35.
446	Vance Steel		Belleville			heat transfer fluids; purchased PCBs.	Monsanto PCB Sales Summaries, 1970.
447	W. J. Sutcliffe Co.	Curle Ave. and Lucia Pl.	Wallington	Paints and varnishes.		paints; varnishes; purchased PCBs	Monsanto PCB Sales Summaries, 1969; New Jersey Industrial Directory, Wallington, 1954/55.
448	Wal Sello Products Inc.	132 Beckwith Ave.	Paterson	Cellophane tapes, laminated products.		adhesives; Purchased PCBs	Monsanto PCB Sales Summaries, 1968-1970; New Jersey Industrial Directories, Paterson, 1960, 1965, 1970, 1975, 1980, and 1985.
449	Walmart Supercenter #5752 (Vornado Inc.)	174 Passaic St.	Garfield	Vornado: Electric fans, air conditioners, dehumidifiers. (Related to O.A. Sutton Corporation and Two Guys from Harrison.)		Small quantity generator of PCB wastes	EDR, p. 44392/66158 4319330.2s.pdf
450	Walter G. Alexander Housing Development	128-130 Parrow St.	Orange	Brownfield.		Deed restriction (caps, soil) for contamination including PCBs.	EDR, pp. 14641, 15413/51539 4430768.1s-1.pdf
451	Ward Food Inc. (Ward Property Partnership, Ward Bakery Building)	1 Fourth Ave. and 13th St.	East Orange	Bread and other bakery products.		heat transfer fluids; Historical large quantity generator of wastes including PCBs; shipped PCB oils to incinerator and PCB wastes to landfill. Multiple shipments of PCB wastes.	Monsanto PCB Sales Summaries, 1968-1970; New Jersey Industrial Directory, East Orange, 1954/55.
452	Warehouse 1250 Valley Brook Ave (1250 Valley Brook Corp.)	1250 Valley Brook Ave.	Lyndhurst	Brownfield. (May be related to Kingsland Clay Products.)		Deed restriction (caps, soil) for contamination including PCBs.	EDR, p. 4910/44205 4326287.1s.pdf
453	Waste Management, Inc.	150 St. Charles St.	Newark	Municipal waste collection/disposal; recycling.	4953	waste handling	www.wm.com
454	Watson Machinery International	74 Railroad Ave.	Paterson	In business for 150 years. Started as turbine water wheel maker, then moved to iron-bridge and automobile manufacturer, then shifted to wire and cable machinery, and finally shifted to making fiber-optic cables.		wire coatings; hydraulic fluids; lubricants	https://njbiz.com/watson-machinery-international/

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	Company	Street Address	City	Company Information	SIC	Industry Basis/Allegation	URL or Other Source
455	Watts-Campbell Co.	1270 McCarter Hwy.	Newark	Heavy machining and special machinery.		hydraulic fluids; lubricants; heat transfer fluids	1974 New Jersey State Industrial Directory, p. G-167.
456	Wayne Machine & Die Co.	100 Furler St.	Totowa	Extruders, screws for injection molders and extruders, barrels, and complete production lines for blown film, sheet, compounding, and tubing. Also offers coatings/laminating equipment.		lubricants; hydraulic fluids; heat transfer fluids; coatings	https://www.packagingimpressions.com/whoswho/company/24149/
457	Weber & Scher Mfg.	1231 U.S. 22, 263 Sussex St.	Newark	Cable and wire production. Tool and die shop. Produced coil winding machines and composite cable sheathing/taping machines.		wire/cable coatings; hydraulic fluids; lubricants	New Jersey Industrial Directory, 1952-53, p. 630; www.webscher.com
458	Welco Acetylene Corp., Welding Rent/Repair Div. (Welco Gases Corp.)	49 St. Charles St.	Newark	Welding and soldering supply.	5085	Deed restriction (caps) for contamination including PCBs.	EDR, p. 25975/44205 4326287.1s.pdf
459	Weldotron Corp.	909 Freilighuysen Ave.	Newark	Shrink-packaging equipment.		heat transfer fluids, hydraulic fluids, lubricants; Purchased PCBs	Monsanto PCB Sales Summaries, 1969-1970.
460	West Hudson Hospital	206 Bergen Ave.	Kearny	Hospital.	8062	Historical small quantity generator of wastes including PCBs.	PVSC Industrial Inventory, 1987, p. 35; EDR, pp. 12745, 15161/44205 4326287.1s.pdf
461	Weston Instruments, Div. Sangamo Weston (Sub. of Schlumberger, Ltd.)	73 W. Ave.	Newark	Produced electrical capacitors. Plant closed 1974.		capacitors; PCBs found onsite	www.westonmeter.or.uk/the_company.html
462	Weston USA Div. Solartron Transducers (Sub. of Schlumberger, Ltd.)	614 Freilighuysen Ave.	Newark	Thermometers, aerospace indicators.	3611	TSCA PCB inspection/ violations found.	PVSC Industrial Inventory, 1987, p. 35; 1974 New Jersey State Industrial Directory, p. G-168; EDR, pp. 43813, 43846, 43855/51539 4330768.1s-1.pdf
463	Wheal Grace Corp.	300 Ralph St.	Belleville	Est. 1967. Printing business.	2732	inks	https://www.manta.com/c/mmf87td/wheal-grace-corporation
464	White Chemical Corp.	660 Freilighuysen Ave.	Newark	Now a Superfund site. Made acid chlorides and fire retardant compounds from 1983 -1990		TSCA PCB inspection; PCBs found onsite.	EDR, pp. 43939, 48686/51538 4330768.1s-1.pdf
465	Wilbur B. Driver (Sub. Of GTE Sylvania, Inc.)	1875 McCarter Hwy.	Newark	Rod, wire, special nickel alloys.	3356	Purchased PCBs.	Monsanto PCB Sales Summaries, 1958-1964; 1974 New Jersey State Industrial Directory, p. G-147.
466	William Van Kruiningen and Sons Landfill	508 Main Ave.	Wallington	Landfill.		Deed restriction (caps, soil) for contamination including PCBs.	EDR, p. 45460/66158 4319330.2s.pdf
467	William Wilhelm Co.	222 Passaic St.	Passaic	Dyes; inks.		dyes	
468	Wilpet Tool	244 Dukes St.	Kearny	Injection molded plastics.		heat transfer fluids; plasticizers	1974 New Jersey State Industrial Directory, Kearny.
469	Wilson Imperial Co.	115 Chestnut St.	Newark	Est. 1928. Products include surface preps, cleaners, bonding liquid, paint additives and paint removers.	2851	paints/coatings; Historical small quantity generator of PCB wastes.	1974 New Jersey State Industrial Directory, p. G-168; EDR, pp. 31019, 32803/51539 4330768.1s-1.pdf
470	Wire Recycling, Inc.		Newark	Scrap Metal Facility, possibly known as H&C Metals		wire coatings	
471	WLIB-AM Transmitter (Inner City Broadcast)	1400 Valleybrook Ave.	Lyndhurst	Radio transmission station.		Large quantity generator of PCB wastes.	EDR, p. 10882/44205 4326287.1s.pdf
472	Woburn Chemical Co. (W.C. Industries, Woburn Chem NJ)	1200 Harrison Ave.	Kearny/Harrison	Agricultural chemicals. (Street address remains constant, although town address changes from Harrison to Kearny.)	3089	plasticizers; purchased PCBs	Monsanto PCB Sales Summaries, 1968; 1974 New Jersey State Industrial Directory, Kearny.
473	WOR Transmitter Facility (RKO General Inc.)	1535 Valley Brook Ave.	Lyndhurst	Radio transmission station.		Historical large quantity generator of wastes including PCBs.	EDR, P. 10890/44205 4326287.1s.pdf
474	XL Plastics	220 Clifton Blvd.	Clifton	Est. 1973. X-L Plastics™ is a manufacturer and distributor of polyethylene film, liners, bags.	2673	plasticizers	x-lplastics.com
475	Zenith Dyeing and Finishing Corp., Inc.	53 E. 23rd. St.	Paterson	Est. 1952. The company's line of business includes finishing purchased manmade fiber and silk broadwoven fabrics.	2269	dyes	https://www.manta.com/c/mbsqznr/zenith-dyeing-finishing-corporation
476	Zumtobel Lighting Co.	141 Lanza Ave., #16D	Garfield	Est. 1950 Commercial, Industrial, and Institutional Electric Lighting Fixtures.	3646	light ballasts	https://www.manta.com/c/mm4x279/zumtobel-lighting-inc

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APPENDIX A

DOCUMENTS CONSIDERED

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Document	Document I.D. Number(s)	Date
The Monstrous Pollution of the Water Supply of Jersey City and Newark		1887
Annual Report of the State Geologist of New Jersey for the Year 1893		1894
Annual Report of the State Geologist of New Jersey for the Year 1894		1895
New Jersey Supreme Court Van Cleve v. PVSC.pdf		7/23/1904
Report of Allen Hazen	MAXUS0008009	6/30/1906
The People of the State of NY v. the State of NJ and Passaic Valley Sewerage Commissioners. Stipulation	LPRSA0193782	10/1/1909
Statement by Herman Blank Chairman of Passaic Valley Sewerage Commissioners of the State of NJ for Public Works Committee House of Representatives in Connection with its Consideration of H. R. 9540	LPRSA0193853	4/8/1910
Original Contract between Passaic Valley Sewerage District and Passaic Valley Sewerage Commissioners	LPRSA0192930	5/15/1911
NJ Industrial Directories - Paterson\NJ Industrial Directory-Paterson-1912.pdf		1912
Secretary of State - Corporation of New Jersey: List of Certificates to December 31, 1911		1914
Municipal Journal Construction Features on the Passaic Valley Sewer.pdf		1/21/1915
Construction Passaic Valley Sewer.pdf		2/18/1915
Municipal Journal Constructing Passaic Valley Pumping Station.pdf		3/18/1915
State of NJ Passaic Sewerage Commissioners Brief Description of Passaic Valley Sewerage Works	LPRSA0191369	10/1/1916
Iron Age, p. 1375		12/14/1916
Distribution List of the Chemical Engineering Catalog		1917
Possible Causes of the Decline of Oil Wells and Suggested Methods of Prolonging Yield		10/26/1917
NJ Industrial Directories - Paterson\NJ Industrial Directory-Paterson-1918.pdf		1918
Bureau of Industrial Statistics Dept of Labor	LPRSA0017781	1/1/1918
The Industrial Directory of NJ	LPRSA0013736; LPRSA0047242	1/1/1918
Engineering and Cement World, pp. 21 and 25		1/1/1918
Reports of Cases Argued and Determined in the Supreme Court and, at Law, in the Court of Errors and Appeals of the State of New Jersey, The Egyptian Lacquer Manufacturing Company, Plaintiff, v. Chemical Company of America, Defendant, submitted October 17, 1919, decided October 29, 1919, Vol. VII, p. 305		1920
Brass World and Platers' Guide, Vol. XVII, No. 5		5/1921
Maier, E.J., "A 'Chemical' Analysis of the Jersey Meadows," <i>Chemical Age</i> , pp. 376-378		9/1921
Black, G.F. - "The Belleville Copper-Mine," Newark Mineralogical Society		1922
Drug & Chemical Markets, pp. 1447 and 1511		1922
Scott, W.W. History of Passaic and Its Environs, Vol.I		1922
[Order Noted and Filed]	LPRSA0004800	6/28/1922
Letter to PVSC re sources of pollution.pdf		4/30/1923
Minutes of the Town Council of the Town of Kearny		7/11/1923
[Supplemental Agreement]	LPRSA0004866	8/1/1923
Drug & Chemical Markets Guide-Book		1924
Minutes of Meetings of the Board of Commissioners of Newark NJ	LPRSA0014495	1/1/1924
Minutes of Meetings of the Board of Commissioners of Newark NJ	LPRSA0015477	1/1/1924
Minutes of Meetings of the Board of Commissioners	LPRSA0014521	9/1/1924
Minutes of Meetings of the Board of Commissioners	LPRSA0015463	9/1/1924
[Subtracted from Meter Readings]	LPRSA0194367	9/8/1924
Letter to PVSC re Manhole samples.pdf		9/19/1924
[Study of the Flow of our Sewers]	LPRSA0194363	9/25/1924
[Main Intercepting Sewer as Computed from the Charts]	LPRSA0194360	9/30/1924
[Flow of Towns in Order of Interception 09/22/0000 - 09/29/0000]	LPRSA0194357	10/15/1924
Table II. Record of Venturi Meters Showing Flow in Mgd	LPRSA0194354	10/15/1924
Table III. Flow of Towns in Order of Interception Week of 09/29/1924 to 10/06/1924	LPRSA0194355	10/15/1924

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Document	Document I.D. Number(s)	Date
Table III. Daily Record of Venturi Meters Showing Flow in Mgd	LPRSA0194347	10/21/1924
Table I. Weekly Record of Weirs Showing Flow in Mgd. Week 11/03/1924 to 11/10/1924	LPRSA0194316	11/3/1924
Table I. Record of Weirs Showing Flow in Mgd	LPRSA0194331	11/10/1924
Table No. 5. Flow of Municipalities Week of 11/17/1924 - 11/24/1924	LPRSA0194302	11/17/1924
[Paterson City Sewer Dept Reports]	LPRSA0189187	11/20/1924
Main Line	LPRSA0194303	11/26/1924
Table III. Week of 12/08/1924 - 12/15/1924	LPRSA0194268	12/8/1924
Main Line	LPRSA0194263	12/15/1924
Table V. Flow of Municipalities Week of 12/22/1924 - 12/29/1924	LPRSA0194252	12/22/1924
U.S. Tariff Commission - Census of Dyes and Other Synthetic Organic Chemicals		1925
Minutes of Meetings of the Board of Commissioners of Newark NJ	LPRSA0014535	1/1/1925
Storm Overflows	LPRSA0189149	3/1/1925
[Sewage Material Deposited]	LPRSA0189224	3/30/1925
Important	LPRSA0189223	4/5/1925
rept on invest poll nav waters and trib 2nd n y District (2)		4/29/1925
PVSC letter to City of Newark.pdf		6/1/1925
Annual Reports War Dept Fiscal Year Ended 06/30/1925 Report of the Chief of Engineers U.S. Army 01/01/1925 in Two Parts Part I	LPRSA0015351	6/30/1925
1926 Report.pdf		1926
U.S. Tariff Commission - Census of Dyes and Other Synthetic Organic Chemicals		1927
NJ Industrial Directories - Paterson\NJ Industrial Directory-Paterson-1927.pdf		1927
Letter of Director Petterson Passaic NJ with Reference to by-Pass on Clifton Sewer	LPRSA0189113	10/31/1927
By-Passing of Crude Sewage from Municipal Disposal Plant	LPRSA0188881	7/26/1928
[Formula Details]	LPRSA0191377	1/1/1930
Dundee Canal Water	LPRSA0189244	10/29/1930
NJ Industrial Directories - Paterson\NJ Industrial Directory-Paterson-1931.pdf		1931
Exhibit # 2 Chart Showing Ave. Daily Sewage Flow-00/01/1924 to 01/01/1931	LPRSA0192818	10/1/1932
Bypassing of Lodi Sewage	LPRSA0188769	4/19/1933
[Report on City Engineer of Passaic on Operating Costs]	LPRSA0191385	10/4/1933
Average Daily Sewage Flow by Years	LPRSA0193748	7/19/1934
Table II Allocation of \$724556.98 Expended for Maintenance and Operation of Passaic Valley Sewerage System for the Year 01/01/1935 among the Contracting Municipalities According to Sewage Flow Contributed by Each Municipality	LPRSA0193188	1/1/1935
A Brief History of Blast-furnace Lead Smelting in America		12/15/1936
Interstate Sanitation Commission Annual Report.pdf		1937
1937 ISC Annual Report.pdf		1937
1938 ISC Annual Report.pdf		1938
NJ Industrial Directories - Paterson\NJ Industrial Directory-Paterson-1938.pdf		1938
Lacquer, U.S. Patent No. 2,120,236		6/14/1938
Lacquer Enamel, U.S. Patent No. 2,141,911		12/27/1938
Table II Allocation of \$910057.85 Expended for Maintenance and Operation of the Passaic Valley Sewerage system for the Year 01/01/1939 among the Contracting Municipalities and Lessees According to the Sewerage Flow Contributed by Each	LPRSA0191712	1/1/1939
Unsigned letter re: 1-AP-47873 Passaic Valley Sewerage Comm. [vs] the Essex County Park Commission	LPRSA0198283	9/19/1939
Table V Net Amounts Due to the Passaic Valley Sewerage Commissioners by Each Municipality for the Year 01/01/1940	LPRSA0191715	1/1/1940
Woodward, H.P. Copper Mines and Mining in New Jersey, New Jersey Department of Conservation and Development		1944
Bulletin 57 Copper Mines and Mining in New Jersey		1944
Synthetic Organic Chemicals US Production and Sales 01/01/1944	LPRSA0054053	1/1/1944

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Document	Document I.D. Number(s)	Date
River Inspection	LPRSA0193244	12/15/1944
Pages from Bogert Childs Report on Repairs, Replacements, and Improvements at Newark Bay Pumping Station.pdf		5/1/1945
The Industrial Directory of NJ 01/01/1946	LPRSA0046025	1/1/1946
U.S. Department of Agriculture, Instructions on Processing for Community Frozen-Food Locker Plants		3/1946
Roark, R.C., and McIndoo, N.E., U.S. Department of Agriculture, A Second Digest of the Literature on DDT (May 1, 1944 to December 31, 1944)		5/1946
"Industrial News," Liquid Carbonic Corp., <i>Chemical Engineering News</i> , Vo. 24, No. 10, pp. 1388-1404		5/25/1946
1947 ISC Report.pdf		1947
The Stipulation in its Sanitation Phases and Passaic Valley Sewage	LPRSA0198628	2/17/1947
Letter to PVSC.pdf		2/20/1947
Sanborn map: The Egyptian Lacquer Mfg. Co., Jacobus Avenue, Kearny, p. 85		3/1947
Roark, R.C., and McIndoo, N.E., U.S. Department of Agriculture, A Third Digest of the Literature on DDT (January through June 1945)		6/1947
Seventieth Annual Report	LPRSA0022066	6/30/1947
Modification Agreement of 07/01/1947	844070015	7/16/1947
Chisholm, R.D., U.S. Department of Agriculture, A Review of DDT Formulations		2/1948
U.S. Patent Office - Jiffy Manufacturing Company, Hillside, NJ, Trade-Mark 441,647		12/21/1948
New Jersey Industrial Directory 01/01/1949	LPRSA0048649	1/1/1949
Appendix A. Order Concerning Discharge of Sewage or Other Polluting Matters from the City of Jersey City into the Water of the Interstate Sanitation District	LPRSA0070414	7/7/1949
Report of Woodbridge, NJ Survey, 9-13-49.pdf	LPRSA0079167	9/13/1949
J. Smith Memo to L.A. Kolker: Preparation of 2,4,5-Trichlorophenol		11/22/1949
1950 ISC Report.pdf		1950
Grindley_1950.pdf		1950
Report of Interstate Sanitation Commission 01/01/1949	LPRSA0023078	1/20/1950
Budocks Technical Digest: Construction, Maintenance & Operation of the Navy's Shore Establishments		2/3/1950
P/S at Glen Cove	LPRSA0115616	2/23/1950
Passaic Valley Sewerage Commissioners Average Daily Sewage Flow 01/01/1950	LPRSA0192116	3/31/1950
Passaic Valley Sewerage Commissioners Average Daily Sewage Flow 10/01/1950 10/01/1951 10/01/1952	LPRSA0192046	10/1/1950
Report on Improving Sedimentation and Dispersal Facilities by Bogert-Chiles Engineering Associates.pdf		1951
Table IX Net Amounts Due to the Passaic Valley Sewerage Commissioners for the Year 01/01/1951	LPRSA0191201	1/1/1951
Table VII Charges for Excess Flow (Above Allotted Capacity for the Year 01/01/1951)	LPRSA0191258	1/1/1951
Table VIII Allocation of \$25545.00 Rental and Excess Use Charges Credited to Each Contracting Municipality in Proportion with Their Unused Capacity in 01/01/1951	LPRSA0191259	1/1/1951
High Density, Free-Flowing Pigment Bases, U.S. Patent No. 2,544,636		3/6/1951
Barne, T. 2,4,5-Trichlorophenol: Operating Instructions #1		3/20/1951
Direct Discharges by Industry into the Interstate Sanitation District (1) Industrial Distribution	LPRSA0122915	7/19/1951
Memo to Board of Directors (Diamond/Kolker)		7/30/1951
Notes: TCP/Tetrachlorobenzene Process		8/22/1951
New Jersey Industrial Directory 01/01/1952 - 01/01/1953	LPRSA0048763; LPRSA0018915	1/1/1952
Table III Allocation of \$1831818.00 Estimated Expenditures for Maintenance and Operation of the Passaic Valley Sewerage System for the Year 01/01/1952	LPRSA0191254	1/1/1952
Isopropyl Esters of 2,4-D & 245-T		3/15/1952

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Document	Document I.D. Number(s)	Date
Operating Instructions: Isopropyl Esters of 2,4-D and 2,4,5-T		3/19/1952
Meeting with Representatives of the Passaic Valley Sewerage Commissioners Wednesday 03/26/1952	LPRSA0094378	3/26/1952
Passaic Valley Sewerage Commissioners Average Daily Sewage Flow 01/01/1952	LPRSA0192113	3/31/1952
[Regarding Industrial Waste Inventory No 1]	LPRSA0104847	11/19/1952
Insurance Expirations - 01/01/1953	LPRSA0191300	1/1/1953
Interstate Sanitation Commission Report 01/01/1952	LPRSA0023235	1/19/1953
Science News Letter, Vol. 63, No. 4, p. 63		1/24/1953
Passaic Valley Outfall Survey 02/03/1953	LPRSA0064432	2/5/1953
Passaic Valley Sewage Treatment Plant	LPRSA0064438	2/9/1953
Bogert Childs Supplemental Report on Improvements.pdf		2/20/1953
[Passaic Valley Sewerage Commissioners Bypassing Report]	LPRSA0189662	3/13/1953
06/01/0000 Supplement Report	LPRSA0189677	6/22/1953
[Passaic Valley Sewerage Commissioners Bypassing Report]	LPRSA0189685	8/10/1953
Jiffy Manufacturing Company advertisement		10/1953
U.S. Patent Office - Manufacture of DDT		10/6/1953
Passaic Valley Sewerage Commissioners vs. City of Newark et als. Civil Action Pretrial Order. Docket No. L-970-53	LPRSA0172008; LPRSA0224908	12/18/1953
[Passaic Valley Sewerage Commissioners Bypassing Report]	LPRSA0189646	12/28/1953
R.P. Cargille Laboratories, Inc. - Practical Refractometry by Means of the Microscope		1954
1954 Report on Repairs, Replacements and Improvements.pdf		1954
Aspinwall, K. Operating Instructions: BEP Esters of 2,4-D and 2,4,5-T Acids		1/15/1954
Passaic Valley Sewerage Commissioners vs. City of Newark et als. Civil Action Judgment. Docket No L-970.53	LPRSA0172020	3/6/1954
Bogert Childs Report on Repairs, Replacements, and Improvements at Newark Bay Pumping Station.pdf		5/1/1954
Survey of Sewage Transmitted Across Municipal and District Lines	LPRSA0194137	6/3/1954
[Sewage Emanates from Outside the Passaic Valley Sewerage Commissioners]	LPRSA0194191	7/14/1954
Tab 47 - Chemical Week - Buyer's Guide	LPRSA0239872	9/18/1954
Letter attaching "Kearny Sells Sewer Bonds," <i>The Newark Evening News</i>		9/30/1954
[Survey of Passaic Valley Trunk Sewer]	LPRSA0194135	10/6/1954
Schoffman, M. Memorandum: 2,4,5-Trichlorophenol		11/2/1954
[Passaic Valley Sewerage Commissioners Bypassing Report]	LPRSA0189585	12/29/1954
Newark Directory 01/01/1955	LPRSA0165604	1/1/1955
Bureau Engineer's Report of Analysis of Data Municipal Sewage Treatment Works.pdf		5/24/1955
[Passaic Valley Sewerage Commissioners Bypassing Report]	LPRSA0189558	11/16/1955
"Corporate Profile... Diamond Alkali," <i>Journal of Agricultural and Food Chemistry</i>		1956
Federal Pacific Electric Company - 1956 Annual Report		1956
[Passaic Valley Sewerage Commissioners Bypassing Report]	LPRSA0189548	3/23/1956
U.S. Patent Office - Process for the Recovery of Pure 2,4,5-Trichlorophenol from Products of the Alkaline Hydrolysis of 1,2,4,5-Tetrachlorobenzene, Olin.		5/29/1956
List of Sewage and Industrial Waste Treatment Plants Owners and Designed Volumes in Metropolitan District as of 06/01/1956	LPRSA0194024; LPRSA0194038; LPRSA0194041	6/1/1956
Burton, J., Diamond Alkali Company. Chronological Listing of Process Development - 2,4,5-TCP		9/12/1956
Tab 46 - Chemical Week	LPRSA0239869	9/15/1956
Outfall Inspections for Year 01/01/1956	LPRSA0115806	12/5/1956
[Passaic Valley Sewerage Commissioners Bypassing Report]	LPRSA0189526	12/27/1956
U.S. Department of Health, Education, and Welfare - Municipal and Industrial Waste Facilities, Regions 1-2		1957

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Document	Document I.D. Number(s)	Date
Classified Membership Directory and Buyer's Guide of the West Hudson Chamber of Commerce	843850035	1/1/1957
[Passaic Valley Sewerage Commissioners Bypassing Report]	LPRSA0189496	2/26/1957
Passaic Valley	LPRSA0064613; LPRSA0064614	5/3/1957
[List of Substances Forbidden in Sewers]	LPRSA0194201	7/19/1957
[Notes on the Status of the Repairs Replacements and Improvements of Newark Bay Pumping Station Passaic Valley Sewerage Commissioners]	LPRSA0064615	9/1/1957
Location & Description of Untreated Sewage Entering Waters Adjacent to Bayonne	LPRSA0065287	9/11/1957
U.S. Patent Office - Resin-Dextrin Compositions and Method of Preparation, Paisley Products, Inc.		10/1/1957
U.S. Patent Office - Improvements in the Preparation of Polychlorophenols, Diamond Alkali Company		11/5/1957
Preliminary Report of the 1958 Upper NY Harbor Survey	LPRSA0118523	1/1/1958
Interstate Sanitation Commission Report 01/01/1957	LPRSA0023429	1/20/1958
Bureau Engineer's Report Relative to Proposed Additions and Alterations to the Existing Sewage Treatment Works for the Passaic Valley Sewerage Commission Newark NJ	LPRSA0076907	4/2/1958
Roanoke Storm Sewer Newark N.J	843190072	5/28/1958
Lawter Chemicals ad in <i>Flying Magazine</i> , p. 71		8/1958
Passaic Valley Sewage Treatment Plant	LPRSA0064648	8/5/1958
State of NJ State Dept of Health Bureau of Public Health Eng Inspection Report	LPRSA0076881	9/11/1958
1959_Effluent to Newark Bay_LPRSA0064657.pdf	LPRSA0064657	1959
Work that [Illegible]	LPRSA0189009	3/2/1959
[The NJ Sewage Treatment Plant Discharged 850 tons of Sludge into Newark Bay on 04/29/1959]	LPRSA0064651	5/6/1959
[Passaic Valley Sewerage]	LPRSA0188950	9/23/1959
[Column with Headers Raw Meter #1 and Treated Meter #2]	LPRSA0064657	10/27/1959
Visit to Passaic Valley Sewage Treatment Plant	LPRSA0064655	10/27/1959
Holbert, P.E. "An Effective Method of Preparing Sections of <i>Bacillus polymyxa</i> Sporangia and Spores for Electron Microscopy <i>Journal of Biophysical and Biochemical Cytology</i> , Vol. 7, No. 2, p. 374		1960
National Academy of Sciences, National Research Council - Industrial Research Laboratories of the United States		1960
01/01/1960 - 01/01/1961 NJ Industrial Directory Plus the NJ Industrial Market Place	LPRSA0053701	1/1/1960
US Tariff Commission Synthetic Organic Chemicals US Production and Sales 01/01/1960 under the Provisions of Sections 332 of the Tariff Act of 01/01/1930 as Amended	LPRSA0055636	1/1/1960
Burton, J. River Contaminants, and Your Memo of March 31st		4/4/1960
Regulatory Files.	LPRSA0225703	8/25/1960
Tab 49 - Chemical Week - Buyer's Guide - 1961	LPRSA0239878	9/24/1960
PVSC to City of Newark.pdf		12/7/1960
PVSC to ISC re Tabulation of Treated Sewage Discharged into Newark and New York Bay		1/20/1961
PVSC Letter to ISC re Tabulation of Quantity of Treated Sewage Discharged with Chart.pdf		1/20/1961
Lubetkin Letter to ISC.pdf	KLL024848	1/20/1961
Siemoneit, J.R. Engineering Design Report, Newark Rehabilitation, Diamond Alkali Company		6/1/1961
Porter_1962.pdf		1962
Progress Report HRC U-1156 (Amended) Projection of Path of Pollution by Model Study 06/30/1962	LPRSA0128060	6/30/1962
Tab 51 - Chemical Week - Buyer's -Guide -1963	LPRSA0239884	9/29/1962
Model Study	LPRSA0128056	10/31/1962
Diamond Alkali Drawing: General Arrangement, First Floor Level (note: date is hard to read)		1963

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New Jersey Wood Finishing v. Minnesota Mining Mfg., (D.N.J.)		1963
01/01/1964 Annual NJ State Industrial Directory	LPRSA0046357	1/1/1964
Price & Lee's Newark Essex County N.J. City Directory 01/01/1964 - 01/01/1965	LPRSA0165766	1/1/1964
"Philadelphia and Reading and Universal Manufacturing," <i>The New York Times</i>		1/4/1964
"Devoe & Raynolds Sold to Celanese," <i>The New York Times Archives</i>		8/24/1964
NJDOH Examining Engineer's Report.pdf		9/9/1964
[Strom Sewer Still Continues]	LPRSA0195160	9/25/1964
Tab 52 - Chemical Week - Buyer's -Guide -1965	LPRSA0239887	10/17/1964
01/01/1965 NJ State Industrial Directory	LPRSA0014766	1/1/1965
National Sanitation Foundation Package Sewage Treatment Plant Research Project	LPRSA0102836	2/1/1965
[Agreement between Roy S Richie and Partners Kitchie Realty Co]	LPRSA0332647	10/28/1965
Memo from T.R. Glenn Jr. re PVSC Call from Sy Lubetkin		10/29/1965
Goodloe, W.A., Diamond Alkali Company - Interim Report - Dioxin Study		3/23/1966
U.S. Patent Office - Polyhalo-Cycloalkene Isocyanate and Imide Carbonyl Chloride Compounds, Diamond Alkali		5/31/1966
U.S. Patent Office - Process for Preparing Halophenoxy-Carboxylic Acids, Diamond Alkali		6/21/1966
[Agreement between Roy S Richie and Partners Kitchie Realty Co]	LPRSA0332650	5/10/1967
U.S. Patent Office - Feed Through Insulator, Universal Manufacturing Corporation		7/4/1967
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USEPA Inventory: Municipal Waste Facilities, Region 2		1968
Hearings before the Subcommittee on Antitrust and Monopoly of the Committee on the Judiciary, United States Senate, Ninety-First Congress, First Session		5/17/1968
Ross, K. "C. & N.W. Merger Terms Recast," <i>Chicago Tribune</i>		7/4/1968
"Paisley Products, Inc. v. Trojan Luggage Company," www.leagle.com/decisions		11/18/1968
U.S. Patent Office - Ballast Apparatus Using Leakage Reactance of Split Primary Winding, Universal Manufacturing Corporation		12/24/1968
Federal Pacific Electric Company Annual Report 1969		1969
Evaluation of the Significance of CSOs.pdf		1969
104(e) Request for Information	849170041	1/1/1969
Ingersoll, B., "DDT on Trial in Wisconsin - Part II," <i>BioScience</i> , Vol. 19, No. 8, pp. 735-736		8/1969
US Government PVSC Data Acquisition.pdf		8/14/1969
U.S. Patent Office - Clamp and Laminations, Universal Manufacturing Corporation		10/21/1969
Report on the Quality of the Interstate Waters of the Lower Passaic River and Upper and Lower Bays of NY Harbor	846620001	11/1/1969
Report on the Quality of the Interstate Waters of the Lower Passaic River and Upper and Lower Bays.pdf		11/1/1969
US DOI Report on the Quality of the Interstate Waters of the Lower Passaic River and Upper and Lower Bays of New York Harbor.pdf		11/1/1969
Conference on Pollution of the Hudson River and its Tributaries.pdf		11/25/1969
U.S. Department of Health, Education, and Welfare, Report of the Secretary's Commission on Pesticides and Their Relationship to Environmental Health		12/1969
01/01/1970 NJ State Industrial Directory	LPRSA0014785	1/1/1970
PVSC Pollutions Corrected During 1969		3/31/1970
Report Upon Proposed Timetable for Additions and Improvements to the Sewerage Facilities of the Passaic Valley Sewerage Commissioners.pdf		7/1/1970
Wilcke, G. "Producers Cite Need for DDT," <i>The New York Times</i> , Archives.		7/5/1970
Durham, W.F., Food and Drug Administration. "Significance of Pesticide Residues to Human Health," <i>Journal of Dairy Science</i> , Vol. 54, No. 5, pp. 701-706		1971
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Remedial Priority Scoring (RPS) Information Request Form	LPRSA0372160	3/8/2012
TPD-PVSC RESPONSE to ESI initial questionnaire.pdf		3/22/2012
TPP-Maxus & Tierra INDEX of Passaic Valley Sewerage Commissioner [PVSC file index] Doc Id. 1997.02).pdf		4/13/2012
LETTER from PVSC to P-TPP-Maxus & Tierra re enclosed docs Bates stamped PVSC PRL 00382-00760 (Doc Id. 2041).PDF		4/25/2012
INDICES of tangible docs as attached with 04.27.12 PVSC letter (Doc Id. 2124.02).pdf		4/27/2012
LETTER from PVSC reposting indices (INDEX attached) (Doc Id. 2124.01).pdf		4/27/2012
TPD-PVSC COVER LETTER for Statement of Track VII Order (Doc Id. 2165).pdf		5/4/2012
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TPD-Goodrich for Kalama REQUESTS (1st set of) for production to PVSC (signed 2012.05.18) [Doc ID 2475].pdf		5/24/2012
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TPD-PVSC LETTER from Michael Witt to Counsel re discovery provided (1st RFPs, 1st Interrogatories) [Doc ID 2466].pdf		5/24/2012
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TPP-Maxus & Tierra REQUESTS (Track VII) for production of documents to PVSC [Doc ID 2501.02].pdf		5/25/2012
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TPD-PVSC CERTIFICATION of Andrew Caltagirone in support of PEG's motion to defer the filing of addl 3rd and 4th party claims [Doc ID 2521].pdf		5/31/2012
TPD-Ashland CERTIFICATE of service re discovery requests to PVSC [Doc ID 2679.04].pdf		6/21/2012
TPD-Ashland INTERROGATORIES (initial) to PVSC [Doc ID 2679.02].pdf		6/21/2012
TPD-Ashland LETTER to Michael Witt enclosing discovery requests to PVSC [Doc ID 2679].pdf		6/21/2012

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TPD-Ashland REQUESTS (1st) for admissions to PVSC [Doc ID 2679.01].pdf		6/21/2012
TPD-Ashland REQUESTS (1st) for production of documents to PVSC [Doc ID 2679.03].pdf		6/21/2012
TPD-Benjamin Moore LETTER to Counsel enclosing discovery to PVSC [Doc ID 2659].pdf		6/21/2012
TPD-Benjamin Moore REQUEST (1st) for production of documents to PVSC [Doc ID 2659.01].pdf		6/21/2012
TPD-Givaudan CERTIFICATE of service re discovery requests to PVSC [Doc ID 2677.04].pdf		6/21/2012
TPD-Givaudan INTERROGATORIES (initial) to PVSC [Doc ID 2677.02].pdf		6/21/2012
TPD-Givaudan LETTER to Michael Witt enclosing discovery requests to PVSC [Doc ID 2677].pdf		6/21/2012
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TPD-Givaudan REQUEST (1st) for production of documents to PVSC [Doc ID 2677.01].pdf		6/21/2012
TPD-Spectraserv REQUESTS (1st set of) for production to PVSC [Doc ID 2655.01].pdf		6/21/2012
TPD-PVSC IMAGE of CD containing bates stamped docs PVSC-PRL 01170-02233 [Doc ID 2692.01].pdf		6/22/2012
TPD-PVSC LETTER to Wolff & Samson enclosing discovery responses to Hilton Davis & Goodrich [Doc ID 2692].pdf		6/22/2012
TPD-PVSC LETTER to Starnes & Warren enclosing discovery responses to Maxus & Tierra's requests to admit [Doc ID 2703].pdf		6/26/2012
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TPD-FER Plating LETTER enclosing request for production of docs to PVSC [Doc ID 2828].pdf		7/17/2012
TPD-PEG LETTER to all counsel re document Tier 2 document requests to PVSC [Doc ID 2823].pdf		7/17/2012
TPD-FER Plating REQUESTS (1st set of) for production to PVSC [Doc ID 2828.01].pdf		7/18/2012
TPP-Maxus & Tierra NOTICE (Track VII) of deposition to PVSC re Praxair Site [Doc ID 2830].pdf		7/18/2012
TPP-Maxus & Tierra NOTICE of deposition of PVSC regarding Hilton Davis Site [Doc ID 2831].pdf		7/18/2012
TPP-Maxus & Tierra NOTICE of deposition of PVSC regarding PPG Site [Doc ID 2832].pdf		7/18/2012
TPD-Seton LETTER enclosing rfps to PVSC [Doc ID 2864].pdf		7/19/2012
Remedial Priority Scoring (RPS) Feedback Form	LPRSA0372161	7/20/2012
TPD-PVSC ANSWERS to Ashland Inc.'s initial interrogatories [Doc ID 2878].pdf		7/20/2012
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TPD-PVSC LETTER to Maxus & Tierra (Andrews Kurth) re deposition notice for Praxair and PPG sites [Doc ID 2909].pdf		7/25/2012
USEPA Scientific Chemical Processing (fact sheet)		8/3/2012
TPD-PVSC LETTER to Wolff & Samson and other counsel re inspection date for documents produced [Doc ID 3019].pdf		8/16/2012
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TPP-Maxus & Tierra SUBPOENA ad testificandum and duces tecum to PVSC re GE RCA Site [3107.05].PDF		9/4/2012
TPP-Maxus & Tierra LETTER to Michael Witt enclosing responses to PVSC's discovery requests [3172].pdf		9/17/2012
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TPD-PVSC CERTIFICATION of Michael Witt in support of plaintiff order to show cause [3189.02].PDF		9/20/2012

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TPD-PVSC LETTER brief to Lombardi in support of plaintiff order to show cause [3189.01].PDF		9/20/2012
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Town of Harrison NJ CSO Inspection Report		11/5/2012
Hyatt, W.H., Jr., K&L Gates. Comments of the Lower Passaic River Study Area Site Cooperating Parties Group for the National Remedy Review Board		11/21/2012
Jarman, W.M., and Ballschiter, K., "From Coal to DDT: The History of the Development of the Pesticide DDT from Synthetic Dyes till <i>Silent Spring</i> ," <i>Endeavour</i> , Vol. 36, No. 4, pp. 131-142		11/21/2012
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Driscoll, C.T., Mason, R.P., Man Chan, H., Jacob, D.J., and Pirrone, N. "Mercury as a Global Pollutant: Sources, Pathways, and Effects," <i>Environmental Science & Technology</i> , 47, pp. 4967-4983		2013
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Compliance Evaluation Report	LPRSA0372292; LPRSA0372295	3/18/2013
Public Notice: NJDEP settlement regarding Syncon Resins, <i>The Star-Ledger</i> , Newark		3/27/2013
"Steel Craft Industries Unveils High-Tech Production Capabilities," www.njmep.org		4/2/2013
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List of Entities from PVSC Review		8/25/2013
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Deed Notice	LPRSA0377657	10/18/2013
Parette, R., and Pearson, W.N., Matson & Associates. "2,4,6,8-Tetrachlorodibenzothiophene in the Newark Bay Estuary: The Likely Source and Reaction Pathways," <i>Chemosphere</i> , 111, pp. 157-163		2014
USEPA 303(d) Impaired Waterbody History Report, Peckman River		2014
Appendix C: Mass Balance Modeling Analysis, Lower Eight Miles of the Lower Passaic River		2014
Data Evaluation Report No. 3: "Contaminant History as Recorded in the Sediments"		2014
The Louis Berger Group, Battelle, HDR/HydroQual. Remedial Investigation Report for the Focused Feasibility Study of the Lower Eight Miles of the Lower Passaic River		2014
Draft NPDES permit that describes the various municipal outfalls for Harrison, Kearney, East Newark, and others		2014
Data Evaluation Report No. 3: Contaminant History as Recorded in the Sediments		1/30/2014
Remedial Investigation Report for the Focused Feasibility Study of the Lower Eight Miles of the LPR		2/5/2014
EPA, Lower Eight Miles of the Lower Passaic River, Part of the Diamond Alkali Superfund Site: Superfund Proposed Plan		4/2014

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USEPA Proposed Plan for Cleaning up the Lower 8 Miles of the Lower Passaic River (presentation)		5/21/2014
Appendix F, Technical Case for the Sustainable Remedy, to the Comments on behalf of the Lower Passaic River Study Area Site Cooperating Parties Group on the Proposed Plan for the Lower Eight Miles of the Lower Passaic River Study Area Portion of the Diamond Alkali Superfund Site		8/2014
Attachment A, History of the Lister Avenue Facility, to the Comments on behalf of the Lower Passaic River Study Area Site Cooperating Parties Group on the Proposed Plan for the Lower Eight Miles of the Lower Passaic River Study Area Portion of the Diamond Alkali Superfund Site		8/2014
Attachment J, Examples of Differences Between the 2007 Draft FFS and 2014 FFS & RI, to the Comments on behalf of the Lower Passaic River Study Area Site Cooperating Parties Group on the Proposed Plan for the Lower Eight Miles of the Lower Passaic River Study Area Portion of the Diamond		8/2014
Consent Judgment, <i>NJDEP, et al. vs. Occidental Chemical Corporation, et al.</i>		8/20/2014
List of Attached Documents for the Administrative Record, Submitted with the August 20, 2014 Comments on behalf of the Lower Passaic River Study Area Site Cooperating Parties Group on the Proposed Plan for the Lower Eight Miles of the Lower Passaic River Part of the Diamond Alkali Superfund Site		8/20/2014
Soil Remedial Action Permit Site Name Pass Aid Commercial Properties LLC A/K/A Interstate Dyeing & Finishing Co Address 358th St City Passaic City County Passaic SRP Program Interest # G000044754 Soil Remedial Action Permit #: RAP14001	LPRSA0377650	10/6/2014
Law, R., Rolfe, J., and Potter, Willard, de maximis, inc. River Mile 10.9 Removal Action - Implications and Lessons Learned for LPRSA Remediation Plans (presentation)		10/9/2014
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EDR DataMap Environmental Atlas		2015
The Changing Sources of Dibenzo-p-dioxins and furans in Sediments and the Ecological Risk of Nekton in the Lower Passaic River and Newark Bay		2015
Compliance Evaluation Summary	LPRSA0377635	2/12/2015
Former IBG Corp 1234 Highway 46 Clifton NJ Response Action Outcome - Areas of Concern - Soils PI # 000424 ISRA Case # E95162 Whitman Project # 99-03-02TD	LPRSA0377821	2/24/2015
U.S. Army Corps of Engineers, Fact Sheet - Lower Passaic River, NJ		3/2015
USEPA - New Jersey Sites. www.epa.gov/region2/cleanup/sites		4/8/2015
EPA, Cleanups in My Community/Cleaning Up Our Land, Water and Air		4/8/2015
Compliance Evaluation Summary	LPRSA0388277	4/13/2015
2015-05-12 CSO Maps		5/12/2015
EDR DataMap Environmental Atlas		6/18/2015
"American Securities Completes Acquisition of Royal Adhesives and Sealants," www.royaladhesives.com		6/19/2015
Ground Water Remedial Action Permit Site Name: IBG Corp DBA Walco Linck Co A/K/A: IBG Corp Current Use: Cube Smart LP Address: 1234 Route 46 City: Clifton City County: Passaic SRP Program Interest #: 000424	LPRSA0378716	6/23/2015
Financial Obligations Summary Report as of 07/30/2015	LPRSA0377845	7/30/2015

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TriAD Environmental Consultants - Final Corrective Action Plan for the 2007-Discovered Solvent Release at the Egyptian Lacquer Manufacturing Company, Franklin, TN		9/4/2015
Mann, K.S., Cross and Simon LLC. Federal Pacific Electric Company		10/6/2015
PVSC. "Laws/Policies: Enabling Legislation," www.nj.gov/pvsc		11/23/2015
PVSC Financial Statements		12/31/2015
Schmitt, J.E. "From the Frontlines to <i>Silent Spring</i> : DDT and America's War on Insects, 1941-1962," <i>Concept</i> , Vol. XXXIX		2016
RPM 2016 Annual Report (Toch Bros)		2016
NJDEP - Receptor Evaluation (RE) Form, Cargille Sons		2016
Columbus McKinnon Corporation, Annual Report and 10-K		2016
Rojas, C. "Developer Buys 65-Acres Site of Former Congoleum Factory," www.nj.com		1/12/2016
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ROD, Attachment E, Updated Mechanistic Model		3/3/2016
Greeley and Hansen, CDM Smith, PVSC Combined and Separated Sewer Systems Maps: East Newark, Hackensack, Harrison, Kearny, Newark, Paterson, PVSC		6/2016
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Cover/Certification Form	LPRSA0388342	6/22/2016
Receptor Evaluation	LPRSA0388340	6/22/2016
Receptor Evaluation Report Cargille Sons 55 Commerce Road Cedar Grove Township New Jersey 07009 NJDEP Case Nos. 15-06-22-1650-11 16-01-04-1539-53 PI # 016875	LPRSA0388341	6/22/2016
Merging Existing Case Cargille Sons 55 Commerce Road Cedar Grove Township New Jersey 07009 PI # 016875 NJDEP Case Nos. 15-06-22-1650-11 16-01-04-1539-53	LPRSA0388346	7/14/2016
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Jiffy Packaging Corporation, opencorporates.com		8/25/2016
Gardner Asphalt Corp 64-84 Jacobus Ave Kearny Town Hudson County Case Tracking #: 43949 SRP-PI: G000000640 Activity Number Reference: RET160001 Hired to Address: Entire Site	LPRSA0372169	9/8/2016
LSRP Notification of Retention or Dismissal	LPRSA0372165	9/8/2016
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PVSC - 2017 Budget - Anticipated Revenue		2017
ASTM Standard E2137-17, "Standard Guide for Estimating Monetary Costs and Liabilities for Environmental Matters."		2017
Mattheiss, M., and Waters, K. Passaic River Environmental Plan (PREP) (presentation)		2017
City of Passaic, Director of Purchasing - Notice of Proposals (Pantasote)		1/3/2017
U.S. General Services Administration - "Pantasote" Imitation Leather: General Information, www.gsa.gov		1/24/2017
Compliance Evaluation Summary	LPRSA0372287; LPRSA0372289; LPRSA0372291; LPRSA0372294	2/17/2017
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Notice of Filing Unsealed and Unredacted Copy of the YPF Entities' Disclosure Statement Objection and Exhibits		4/8/2017
Baltimore City Department of Public Works - Back River Wastewater Treatment Plant, publicworks.baltimorecity.gov		5/22/2017
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Columbus McKinnon Corp, Form 10-K Annual Report		5/31/2017
"Newsote, Inc.," companynj.com		6/27/2017
"Newsote, Inc.," relationshipscience.com		6/27/2017
"Pantasote Inc.," indianadb.com		6/27/2017
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USEPA - FRS Facility Detail Report: Pantasote Inc Wallcovering Div		6/27/2017
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Jeffrey S. Podell, Chairman & President at Newsote, Inc., relationshipscience.com		6/27/2017
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"Passaic's East Side Lower Dundee," streettotheleft.weebly.com		6/30/2017
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"Ladenburg Thalmann, About Us," www.ladenburg.com		7/3/2017
NJ Division of Revenue and Enterprise Services. Business Name Search: Newsote, Inc.		7/3/2017
"About AOS," aosco.com		7/5/2017
"Construction Adhesives Company, Inc.," cepi.io/companies		7/5/2017
"Construction Adhesives Company," listings.findthecompany.com		7/5/2017
"Deying Contractors: Sunbrite Dye Company," www.fashionindex.com		7/5/2017
City of Paterson, NJ. "Wright Aeronautical Corp.," www.patersonnj.gov		7/5/2017
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Neocrete trademark, bizstanding.com		7/5/2017
"Thermal Desorption - Case Study: Industrial Latex Superfund Site," www.geoengineer.org		7/10/2017
81 Jacobus Ave (Farnow), njparcels.com		7/10/2017
Bloomberg, "Household Products: Company Overview of Ronson Corp.," www.bloomberg.com		7/10/2017
Amfibi Business Directory, Egyptian Lacquer, www.amfibi.com		7/31/2017
Egyptian Lacquer Manufacturing Company, www.manta.com		7/31/2017
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"Egyptian Coatings/The Egyptian Lacquer Mfg. Co." www.egyptcoat.com		8/2/2017
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"Sewer Department," Totowa,		8/16/2017
"Cargille Labs," www.cargille.com		10/17/2017
"Cargille," State of New Jersey Division of Revenue and Enterprise Services		10/17/2017
"Cargille Laboratories," www.manta.com		10/19/2017
"Cargille-Sacher Laboratories Inc.," www.buzzfile.com		10/19/2017
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"Intek Plastics Acquires Elite Plastic," www.intekplastics.com		3/19/2018
Final Composite PCB Users List		3/22/2018
PVSC, Service Area System Characterization Report		6/2018
Complaint, <i>Occidental Chemical Corporation vs. 21st Century Fox America, Inc., et al.</i>		6/30/2018
Percent of WWT to River (Killam-based Calculations).pdf		12/18/2018
USEPA. "Urban Waters and the Passaic River/Newark (New Jersey)		2019
Additional Inventory Evaluation for Lower Eight Miles Lower Passaic River.pdf		4/3/2019
EPA Method for Estimating Inventory for Lower Eight Miles Lower Passaic River-FINAL.pdf		7/30/2019

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Document	Document I.D. Number(s)	Date
Final Natural Resource Damage Assessment Plan for the Diamond Alkali Superfund Site		1/2020
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APPENDIX B

SOURCES OF COCs TO THE LPRSA

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Sources of COCs to the LPRSA

Available data on the historical sources for each COC in the New York/New Jersey Harbor area and the watershed including the LPRSA are summarized below. This analysis does not examine discharges from specific facilities, other than EPA conclusions regarding the Diamond Alkali facility.

Dioxins and Furans¹

Dioxins and furans are a family of compounds with similar structure and chemical characteristics.² They are insoluble in water, and tend to attach to organic particles that can be transported through air, water, and land emissions. At the request of EPA, the New York Academy of Sciences (“NYAS”) examined *current* sources of dioxin and furan releases in the New York/New Jersey Harbor watershed, including the Passaic River. The report was issued in 2006.³ They concluded that a major current source of dioxin atmospheric deposition in the New York/New Jersey watershed is combustion of materials containing carbon and a chlorine source, from activities such as:

- Uncontrolled burning such as structural/building fires, open burning (*e.g.*, agricultural, residential, garbage), vehicle and tire fires, and fires at waste management facilities and dumpsters,
- Controlled combustion at incinerators such as municipal solid waste, hazardous waste, sewage sludge, crematoria, and medical waste incinerators,

¹ The NYAS study used the term “dioxins” as shorthand for the suite of 210 polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran compounds (PCDDs/PCDFs), including 2,3,7,8-TCDD and “dioxin-like compounds” such as coplanar PCBs, polychlorinated naphthalenes, and brominated and chlorinated/brominated dioxins. Of these, the compound 2,3,7,8-TCDD is the most toxic. The report also used “dioxins” to refer to data sets where fewer than the 210 compounds were measured. This report follows the NYAS convention and uses “dioxins” to mean 2,3,7,8-TCDD, TCDD toxic equivalents (“TEQs”), or PCDDs/PCDFs, unless otherwise noted. Source: G.R. Munoz and M.A. Panero, New York Academy of Sciences, Pollution Prevention and Management Strategies for Dioxins in the New York/New Jersey Harbor, August 2006, pp.33-34.

² Centers for Disease Control and Prevention, “Dioxins, Furans and Dioxin-Like Polychlorinated Biphenyls,” retrieved from https://www.cdc.gov/biomonitoring/DioxinLikeChemicals_FactSheet.html.

³ G.R. Munoz and M.A. Panero, New York Academy of Sciences, Pollution Prevention and Management Strategies for Dioxins in the New York/New Jersey Harbor, August 2006.

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- Landfill gas flares, and
- Combustion of contaminated/treated/painted wood.

NYAS identified the Diamond Alkali facility as a major historical contributor of dioxins to the New York/New Jersey Harbor watershed.⁴ While the focus of the NYAS study was to examine present mass flows into and out of the New York/New Jersey Harbor rather than just the Passaic River, additional research has focused more narrowly on inputs to the LPRSA. One study reconstructed historical discharges from the 2,4,5-trichlorophenol purification process at the Diamond Alkali facility, finding that the 2,3,7,8-TCDD mass discharged from this process could account for the mass of 2,3,7,8-TCDD found in the LPRSA. This finding was further supported by sediment core dating from nearby sediments.⁵

A fingerprinting study by Anchor QEA concluded that the Diamond Alkali facility was the “dominant source” of 2,3,7,8-TCDD (2,3,7,8-tetrachlorodibenzodioxin) located in River sediments in the lower 14-mile stretch of the LPRSA.⁶ In the Anchor QEA study, 1,2,3,4,6,7,8-HpCDD (1,2,3,4,6,7,8-heptachlorodibenzodioxin) and OCDD (octachlorodibenzodioxin), both commonly emitted by vehicle exhaust and wood fires, with OCDD also a weathering component of pentachlorophenol, were each noted as a major component of contamination above Dundee Dam and occurring at similar levels below Dundee Dam, and were thus determined to be emissions from regional background sources. Peak 2,3,7,8-TCDD concentrations from sediment cores were found to date from the 1950s, the peak period of discharging from the Diamond Alkali facility. Secondary concentration peaks were found to coincide with a 1960 trichlorophenol autoclave explosion that occurred at the Diamond Alkali facility. Additionally, concentration

⁴ G.R. Munoz and M.A. Panero, New York Academy of Sciences, Pollution Prevention and Management Strategies for Dioxins in the New York/New Jersey Harbor, August 2006, pp. 107-109 and Figure 3, p. 28.

⁵ R. Parette, D.J. Velinsky, and W.N. Pearson, “Reconstruction of Historical 2,3,7,8-tetrachlorodibenzo-*p*-dioxin Discharges from a Former Pesticide Manufacturing Plant to the Lower Passaic River,” *Chemosphere*, Vol. 212, 2018, pp. 1125-1132.

⁶ J.D. Quadrini, W. Ku, J.P. Connolly, D.A. Chiavelli, and P.H. Israelsson, Anchor QEA, “Fingerprinting 2,3,7,8-Tetrachlorodibenzodioxin Contamination Within the Lower Passaic River,” *Environmental Toxicology and Chemistry*, Vol. 34, No. 7, 2015, pp. 1485-1498.

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ratios of 2,3,7,8-TCDD to total TCDD were highly correlated, with ratios from samples from the Diamond Alkali facility closely matching those found in Passaic River sediments.

The Anchor QEA researchers again found PCDD/F (polychlorinated dibenzodioxin/polychlorinated dibenzofuran) congener composition patterns in the samples at the Diamond Alkali facility and the sediment samples from River Mile (“RM”) 0 to RM 10.9 to be highly similar.⁷ In the area of RM 14 to RM 17.4, the PCDD/F congener fingerprinting closely matches that from above Dundee Dam. The ratios of 2,3,7,8-TCDD to total TCDD were found to support a similarity in sources for RM 0 to RM 14, with a shift in concentration ratios from RM 14 to the Dundee Dam as more consistent with upstream sources with some tidal intrusions from below.

The findings of the Anchor QEA research (and prior research reviewed by the study) are consistent with EPA’s determination in its 2014 Remedial Investigation (“Remedial Investigation”) of Operable Unit 2 (“OU-2”) that the measured ratios of 2,3,7,8-TCDD to Total TCDD indicates the source is “almost exclusively industrial in nature since the early 1950s.”⁸ EPA selected 2,3,7,8-TCDD as the indicator chemical for dioxins/furans because it comprised the largest component (about 70%) of these compounds.⁹ EPA data indicate the source of 2,3,7,8-TCDD is almost completely from legacy contamination, with data linking this contamination largely to the Diamond Alkali facility for RM 0 to RM 14 of the LPRSA. Contributions to total TCDD include only a minor contribution (3 percent) from above Dundee Dam. In addition, a small contribution (3-5 percent) enters the LPRSA from tidal flow from Newark Bay, determined by EPA

⁷ Anchor QEA notes that other authors identified another potential PCDD/F source at approximately RM 11 (near the Third River), but Anchor QEA determined that the Diamond Alkali facility fingerprint was the dominant source to the Passaic River from RM 0 to 14 and that the other source could not be confirmed in the sediments.

⁸ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 4-38.

⁹ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 4-6 and Table 4-11, Summary of Indicator Chemicals.

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as likely having originated from the LPRSA.¹⁰ **Therefore, data indicate that the major source for this COC, at least for RM 0 to RM 14, was the Diamond Alkali facility.**

DDX

DDX, including DDT and metabolites DDD and DDE, were developed as organochlorine pesticides. They tend to adsorb onto organic matter or suspended particles.¹¹ While NYAS did not conduct a study of DDX contamination in the New York/New Jersey Harbor, another research study examined DDX in sediment samples for Newark Bay and its tributaries, including the Passaic River. The study noted that the highest concentrations of DDX occurred in the lower Passaic River, and at depths dating from peak periods of manufacture and use of DDT, 1940 to 1970.¹²

In the Remedial Investigation, EPA examined dated sediment core profiles, using DDE as an indicator of DDX. EPA found that DDE maximum values occurred over a longer period as compared to PCBs and 2,3,7,8-TCDD, with high values in 1970, and a slow decrease of the last 25 years.¹³ The Remedial Investigation estimated that 86 percent of the total DDX mass was located in the Tierra Removal (Diamond Alkali facility) area, with only 4,000 kg (out of a total of 29,000 kg) located outside of the removal area.¹⁴

The Remedial Investigation also noted an ongoing contribution of DDE (as a surrogate for DDX) from upstream, finding that 10 percent of DDE emanates from the Upper Passaic River, 8 percent

¹⁰ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 4-7.

¹¹ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 5-6.

¹² C.A. Gillis, N.L. Bonnevie, S.H. Su, J.G. Ducey, S.L. Huntley, and R.J. Wenning, ChemRisk, "DDT, DDD, and DDE Contamination of Sediment in the Newark Bay Estuary, New Jersey," *Environmental Contamination and Toxicology*, Vol. 28, 1995, pp. 85-92.

¹³ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, Appendix A, Data Evaluation Report No. 3: "Contaminant History as Recorded in the Sediments," pp. 3-15 to 3-16.

¹⁴ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 4-27.

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from Newark Bay, 3 percent each from tributaries and 1 percent from CSOs and stormwater, leaving 78 percent from historical legacy contamination in the lower Passaic River.¹⁵ As discussed above, it is likely that at least 86 percent of this legacy contamination was related to the Diamond Alkali facility's historical operations.

PCBs

PCBs consist of a group of 209 compounds, known as congeners, with various chlorination patterns on a structure of two attached carbon (benzene) rings.¹⁶ Commercial production of PCBs began in 1929. In 1971, there was a voluntary restriction of PCB sales to closed system applications. Regulations passed in 1976 under the Toxic Substances Control Act ("TSCA"), regulated PCB use and handling, subsequently prohibiting most uses except in a limited set of enclosed applications by 1977.¹⁷

While approximately 77 percent of PCBs were used in the production of transformers and capacitors in the U.S., PCBs were also employed in a wide variety of applications and products such as circuit breakers, heat transfer equipment, compressors, vacuum pumps, hydraulic fluids, lubricants, plastics/resins, paints and coatings, rubber, adhesives, sealants/caulks, flame-retardant materials, insulating materials, siding, shingles, flooring, dye carriers in carbonless copying paper, inks, waxes, wood preservatives, and pesticides. PCBs were also included in dust control sprays for roads, railroad yard, and utility work areas.¹⁸ PCBs can also be generated

¹⁵ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, pp. 8-8 to 8-9.

¹⁶ M. Panero, S. Boehme, and G. Munoz, New York Academy of Sciences, *Pollution Prevention and Management Strategies for Polychlorinated Biphenyls in the New York/New Jersey Harbor*, February 2005, p. 23.

¹⁷ M. Panero, S. Boehme, and G. Munoz, New York Academy of Sciences, *Pollution Prevention and Management Strategies for Polychlorinated Biphenyls in the New York/New Jersey Harbor*, February 2005, pp. 30 and 44.

¹⁸ M. Panero, S. Boehme, and G. Munoz, New York Academy of Sciences, *Pollution Prevention and Management Strategies for Polychlorinated Biphenyls in the New York/New Jersey Harbor*, February 2005, pp. 22, 29-30, 44-45, and 65.

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inadvertently as part of manufacturing processes that combine carbon and chlorine at high temperature such as the production of dyes, pigments, titanium dioxide, and ferric chloride.¹⁹

In 2005, at the request of EPA, NYAS completed a study of the release of PCBs to the New York/New Jersey Harbor watershed.²⁰ This study estimated 1929-1975 PCB sales to the watershed at 33,034 metric tons.²¹ The report noted that emissions of PCBs are continuing decades after production and sales ended, as products containing PCBs continue to be used, recycled, combusted, and disposed. The report concluded that, at present, most of the PCBs enter the Harbor through runoff, tributary inputs, volatilization, and deposition as well as remobilization from previously contaminated sites.²²

The NYAS study looked broadly at the New York/New Jersey Harbor watershed, rather than more narrowly focusing on the Passaic River. In the Remedial Investigation, EPA attributed current PCB contamination in the LPRSA mostly to resuspension of historical contributions of PCBs (estimated at 81 percent of the current source), with contributions from the Upper Passaic River (11 percent), tidal flow from Newark Bay (7 percent), and tributary flows (1 percent) accounting for the remaining sources.²³ This finding is consistent with PCB testing conducted by the U.S. Geological Survey of PCB concentrations in tributaries to the Passaic River, where the Upper Passaic River and Pompton River (which enters the Passaic River above Dundee Dam) and

¹⁹ M. Panero, S. Boehme, and G. Munoz, New York Academy of Sciences, Pollution Prevention and Management Strategies for Polychlorinated Biphenyls in the New York/New Jersey Harbor, February 2005, pp. 65-67.

²⁰ M. Panero, S. Boehme, and G. Munoz, New York Academy of Sciences, Pollution Prevention and Management Strategies for Polychlorinated Biphenyls in the New York/New Jersey Harbor, February 2005.

²¹ M. Panero, S. Boehme, and G. Munoz, New York Academy of Sciences, Pollution Prevention and Management Strategies for Polychlorinated Biphenyls in the New York/New Jersey Harbor, February 2005, p. 31.

²² M. Panero, S. Boehme, and G. Munoz, New York Academy of Sciences, Pollution Prevention and Management Strategies for Polychlorinated Biphenyls in the New York/New Jersey Harbor, February 2005, p. 39.

²³ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, pp. 5-22 to 5-23 and 8-8 to 8-9.

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tributaries (particularly Saddle River) were found to contribute significant PCB loads (see Table PCB1).²⁴

**Table PCB1. PCB Loads (g/yr) in Passaic River Tributaries
(collected 2003-2004)**

Tributary	Dissolved PCB Load (g/yr)	Suspended Sediment-Bound PCB Load (g/yr)
Upper Passaic River (above confluence with Pompton River)	549	644
Pompton River	349	352
Saddle River	212	2,320
Third River	47	132
Second River	9.2	37
Comparison: Passaic River head-of-tide at Little Falls, NJ	1,600	5,600

Sediment core analyses indicate that peak PCB discharges into the Passaic River likely occurred in the late 1950s and early 1960s, with highest deposition in the 1955 to 1975 time-frame, and slowly declining thereafter.²⁵ Overall, the data support historical sources of PCBs consistent with the peak sales period for PCBs, with a significant portion entering the system from the Upper Passaic River, and some from tributaries.

²⁴ T.P. Wilson and J.L. Bonin, U.S. Geological Survey, Occurrence of Organic Compounds and Trace Elements in the Upper Passaic and Elizabeth Rivers and Their Tributaries in New Jersey, July 2003 to February 2004: Phase II of the New Jersey Toxics Reduction Workplan for New York - New Jersey Harbor, prepared in cooperation with NJDEP, Scientific Investigations Report 2007-5136, 2008, Table 10, p. 24.

²⁵ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 8-4, Figure 4-75a, and Appendix A, Data Evaluation Report No. 3: "Contaminant History as Recorded in the Sediments," p. 3-19.

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*NOT BINDING OR TO BE DEEMED AN ADMISSION FOR ANY OTHER PURPOSE OR PROCEEDING***Mercury**

Mercury is another COC in the LPRSA that has had numerous historical and ongoing sources, both naturally-occurring and anthropogenic. At EPA's request, NYAS also used regional and national data to study sources of mercury to the New York/New Jersey Harbor watershed, examining air, land, and water routes as sources. This study found air discharges of mercury account for approximately 13 percent of total releases, including, for example: (1) combustion by utilities, industrial/commercial furnaces, residential furnaces, automobiles, and crematoria and (2) volatilization from fluorescent lamps, hospitals, residential thermometers, and laboratories. Wastewater disposal of mercury was found to account for 24 percent of discharges, largely caused by dental facilities and hospitals, with additional contributions by laboratories, and residential waste including thermometers. Finally, solid waste accounted for 63 percent of mercury discharges, with almost half contributed by dental facilities, followed by switches, hospital waste, thermostats, fluorescent lamps, residential thermometers, laboratory waste, and batteries.²⁶ While these sources account for the initial releases of mercury, the contaminant may then be redistributed through water treatment which separates the contaminant into effluent or sludge, with the sludge redistributing the contaminant through incineration, fertilizer application, or landfilling.²⁷

The NYAS study largely omits historical industrial discharges of mercury. Columbia University researchers contributing to the NYAS study investigated historical sources of mercury to the Hudson-Raritan basin during 1880-2000 in their examination of mercury inputs into the New York/New Jersey Harbor.²⁸ They found that sediment dating of mercury showed a rapid decrease in mercury deposition at the end of the 20th century due to reduced mercury use overall, the

²⁶ A.L.C. de Cerreno, M. Panero, and S. Boehme, New York Academy of Sciences, Pollution Prevention and Management Strategies for Mercury in the New York/New Jersey Harbor, May 14, 2002, Table 11, p. 64.

²⁷ A.L.C. de Cerreno, M. Panero, and S. Boehme, New York Academy of Sciences, Pollution Prevention and Management Strategies for Mercury in the New York/New Jersey Harbor, May 14, 2002, Table 12, p. 64.

²⁸ N.J. Themelis and A.F. Gregory, Columbia University, Sources and Material Balance of Mercury in the New York – New Jersey Harbor, Report to the New York Academy of Sciences, October 3, 2001.

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change from coal to gas as a fuel, and the change from historical incinerators to controlled waste-to-energy combustion plants.

Both production and consumption of mercury rapidly declined starting in the 1980s as regulations were implemented controlling mercury in batteries and fungicides in paints, and as producers reduced mercury use in products such as thermometers, switches, and thermostats. By the 1990s, mercury recycling regulations further reduced releases to the environment.²⁹ Research examining mean concentrations of mercury in Newark Bay sediments indicates some concentrations dating from before 1940, with higher concentrations dating to the 1940-1980 period (peaking in 1940) and declining significantly thereafter.³⁰ In the late 1980s, an EPA study of mercury releases into the New York/New Jersey Harbor estimated relative contributions of mercury at that time from the following source categories (see Table M1):³¹

Table M1. Sources of Mercury to the NY/NJ Harbor

Source	Contribution (%)
Municipal	39.59%
Industrial	0%
CSO	6.71%
Stormwater	2.69%
Tributaries	50.78%
Leachate	0.28%
Atmospheric	NA

NA = Not Available

²⁹ N.J. Themelis and A.F. Gregory, Columbia University, Sources and Material Balance of Mercury in the New York – New Jersey Harbor, Report to the New York Academy of Sciences, October 3, 2001, p.10.

³⁰ T.J. Iannuzzi and R.J. Wenning, “Distribution and Possible Sources of Total Mercury in Sediments from the Newark Bay Estuary, New Jersey,” *Bulletin of Environmental Contamination and Toxicology*, Vol. 55, 1995, pp. 901-908, Figure 2.

³¹ HydroQual, Inc., Task 7.1: Assessment of Pollutant Loadings to New York – New Jersey Harbor, prepared for EPA Region II, January 1991, Table 2-3, p. 8, and Figure 2-9, p. 18.

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While industrial sources are not identified as contributors as of the 1980s, it is likely that a portion of the tributary (and possibly stormwater and CSO) sources are comprised of historical legacy contamination from industrial and other sources.

Looking at data more closely related to potential discharges to the LPRSA, data on mercury in the PVSC effluent shows a significant decrease in mercury concentrations over recent years, estimated at 800 kg/year in 1987 and declining to approximately 50 kg/year in 1998.³² Likewise, influent concentrations of mercury to the PVSC showed a decline in the 1980s, from 48.0 µg/l during 1979-1980 to 5.59 µg/l during 1987/1988.³³ Analysis of sediment cores in the Passaic River dates peak concentrations of mercury to the 1950s and 1960s.

As with sediment concentrations of most other metals (with the exception of lead), the maximum concentrations for mercury were higher in the upper portion of the LPRSA (RM 11 and RM 12.6) as compared to the lower portion of the River (RM 1.4 to RM 7.8).³⁴ Sampling has shown elevated concentrations of mercury both above and below Dundee Dam, as shown in Table M2 below, indicating the likelihood of upstream contributions to contamination in the LPRSA.³⁵

³² N.J. Themelis and A.F. Gregory, Columbia University, Sources and Material Balance of Mercury in the New York – New Jersey Harbor, Report to the New York Academy of Sciences, October 3, 2001, p.25.

³³ HydroQual, Inc., Task 7.1: Assessment of Pollutant Loadings to New York – New Jersey Harbor, prepared for EPA Region II, January 1991, Table 4-8, p. 48.

³⁴ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, Appendix A, Data Evaluation Report No. 3: “Contaminant History as Recorded in the Sediments,” p. 3-18.

³⁵ T.J. Iannuzzi and R.J. Wenning, “Distribution and Possible Sources of Total Mercury in Sediments from the Newark Bay Estuary, New Jersey,” *Bulletin of Environmental Contamination and Toxicology*, Vol. 55, 1995, pp. 901-908, Table 1.

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**Table M2. Mercury Sediment Mean Concentrations (mg/kg)
(collected 1991-1993)**

Depth (cm)	Upper Passaic River (mg/kg)	Lower Passaic River (mg/kg)
Surface	2.6	3.5
20 – 80	2.8	7.5
90 – 140	3.5	7.2
> 150		5.2

The Remedial Investigation noted an ongoing contribution of mercury from upstream, finding that 11 percent of mercury still emanates from the Upper Passaic River.³⁶ This contribution from upstream is consistent with testing conducted by the U.S. Geological Survey of mercury concentrations in tributaries to the Passaic River, which shows that the Upper Passaic River and Pompton River (which enters the Passaic River above Dundee Dam) and other tributaries contribute significant mercury amounts both above and below Dundee Dam (see Table M3).³⁷

³⁶ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, pp. 8-8 to 8-9.

³⁷ T.P. Wilson and J.L. Bonin, U.S. Geological Survey, Occurrence of Organic Compounds and Trace Elements in the Upper Passaic and Elizabeth Rivers and Their Tributaries in New Jersey, July 2003 to February 2004: Phase II of the New Jersey Toxics Reduction Workplan for New York - New Jersey Harbor, prepared in cooperation with NJDEP, Scientific Investigations Report 2007-5136, 2008, Table 10, p. 24.

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**Table M3. Mercury Loads (g/yr) in Passaic River Tributaries
(collected 2003-2004)**

Tributary	Dissolved Mercury Load (g/yr)	Suspended Sediment Mercury Load (g/yr)
Upper Passaic River (above confluence with Pompton River)	*--	*6,500
Pompton River	*--	*3,400
Saddle River	120	4,200
Third River	46	130
Second River	*--	*1,200
Comparison: Passaic River head-of-tide at Little Falls, NJ	1,030	15,000

*Note: Dissolved concentrations were removed through blank elimination. Therefore, suspended sediment mercury load may be higher (representing both dissolved and suspended loads).

Municipality contributions of mercury to the LPRSA are also documented by mercury measurements in samples of municipality drinking water.³⁸

Overall, there were significant historical contributions of mercury from municipal sources, combustion deposition, and industrial sources both above and below Dundee Dam.

Copper

Unlike some of the other COCs, NYAS did not conduct a study of copper sources to the New York/New Jersey Harbor. However, Hydroqual conducted a study for EPA examining the percentage mass flow of copper into the New York/New Jersey Harbor in the late 1980s, estimating the sources as shown in Table C1.³⁹

³⁸ Water distribution system sampling data provided by 16 municipal water systems in the PVSC service district show varying levels of copper, lead and mercury at various times since 1983, the earliest data provided in response to New Jersey Open Public Record Act requests made in 2019.

³⁹ HydroQual, Inc., Task 7.1: Assessment of Pollutant Loadings to New York – New Jersey Harbor, prepared for EPA Region II, January 1991, Table 2-3, p. 8, and Figure 2-8, p. 17.

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Table C1. Sources of Copper to the NY/NJ Harbor

Source	Contribution (%)
Municipal	56.97%
Industrial	0.46%
CSO	7.93%
Stormwater	7.04%
Tributaries	22.12%
Leachate	0.25%
Atmospheric	5.23%

The overwhelming current contributor is municipal wastewater discharges, followed by tributary sources. Legacy sources of copper would be a component of tributary sources, and to some extent, stormwater and CSO sources.

The 2014 Remedial Investigation evaluated dated sediment core samples for copper, finding peak concentrations during the 1950s and 1960s. Related to this time period, the Remedial Investigation also found concentrations at RM 11 and RM 12.6 that were higher than the concentrations found downstream at RM 1.4 to RM 7.7, indicating a potential upstream source during this time.⁴⁰ The Remedial Investigation also noted ongoing contributions of copper from upstream, finding that 14 percent of copper still emanates from the Upper Passaic River, with 12 percent sourced from Newark Bay, and 1 percent each from tributaries and CSOs, as shown in Table 2.⁴¹ Municipality contributions of copper to the LPRSA are also documented by copper measurements in samples of municipality drinking water.⁴² Overall, it appears that historical copper releases would have emanated largely from municipal wastewater sources, with some contribution from historical industrial sources both above and below Dundee Dam.

⁴⁰ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, Appendix A, Data Evaluation Report No. 3: "Contaminant History as Recorded in the Sediments," pp. 3-15 to 3-17.

⁴¹ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, pp. 8-8 to 8-9.

⁴² Water distribution system sampling data provided by 16 municipal water systems in the PVSC service district show varying levels of copper, lead and mercury at various times since 1983, the earliest data provided in response to New Jersey Open Public Record Act requests made in 2019.

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Lead

NYAS did not conduct a study of lead sources to the New York/New Jersey Harbor. However, HydroQual conducted a study for EPA examining the percentage mass flow of lead into the New York/New Jersey Harbor in the late 1980s, estimating the sources shown in Table L1.⁴³

Table L1. Sources of Lead to the NY/NJ Harbor

Source	Contribution (%)
Municipal	27.40%
Industrial	0.24%
CSO	14.20%
Stormwater	5.86%
Tributaries	37.98%
Leachate	0.36%
Atmospheric	13.96%

The major sources of lead to the harbor are tributaries, municipal inputs, and atmospheric deposition.

The 2014 Remedial Investigation evaluated dated sediment core samples for lead, finding peak concentrations during the 1950s and 1960s. Related to this time period, the Remedial Investigation found the highest peak concentration at RM 7.8 followed by concentrations at RM 11 and RM 12.6, unlike the other metal COCs (which observed maximum concentration at RM 11 and RM 12.6), indicating a possibility of different sources for lead versus other metals. Lead concentrations were also different in that the peaks downstream (RM 1.4 and RM 2.2) occurred in the mid-1950s, whereas peak concentrations upstream (RM 12.6) occurred in the mid-1960s. Lead concentrations declined in sediments deposited after this time.⁴⁴

⁴³ HydroQual, Inc., Task 7.1: Assessment of Pollutant Loadings to New York – New Jersey Harbor, prepared for EPA Region II, January 1991, Table 2-3, p. 8, and Figure 2-8, p. 17.

⁴⁴ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, Appendix A, Data Evaluation Report No. 3: “Contaminant History as Recorded in the Sediments,” p. 3-18.

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The Remedial Investigation also noted an ongoing contribution of lead from upstream, finding that 19 percent of lead still emanates from the Upper Passaic River; an additional 7 percent comes from New Bay, and 4 percent comes from tributaries and CSOs. Only 71 percent comes from legacy contamination in the lower Passaic River.⁴⁵ This contribution from upstream is consistent with testing conducted by the U.S. Geological Survey of lead concentrations in tributaries to the Passaic River, where the Upper Passaic River and Pompton River (which enters the Passaic River above Dundee Dam) and other tributaries contribute significant lead amounts (see Table L2).⁴⁶

**Table L2. Lead Loads (g/yr) in Passaic River Tributaries
(collected 2003-2004)**

Tributary	Dissolved Lead Load (g/yr)	Suspended Sediment Lead Load (g/yr)
Upper Passaic River (above confluence with Pompton River)	*--	*1,040
Pompton River	*--	*310
Saddle River	*--	*1,140
Third River	2.8	89
Second River	2.1	56
Comparison: Passaic River head-of-tide at Little Falls, NJ	320	2,700

*Note: Dissolved concentrations were removed through blank elimination. Therefore, suspended sediment mercury load may be higher (representing both dissolved and suspended loads).

⁴⁵ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, pp. 8-8 to 8-9.

⁴⁶ T.P. Wilson and J.L. Bonin, U.S. Geological Survey, Occurrence of Organic Compounds and Trace Elements in the Upper Passaic and Elizabeth Rivers and Their Tributaries in New Jersey, July 2003 to February 2004: Phase II of the New Jersey Toxics Reduction Workplan for New York - New Jersey Harbor, prepared in cooperation with NJDEP, Scientific Investigations Report 2007-5136, 2008, Table 10, p. 24.

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Municipality contributions of lead to the LPRSA are also documented by lead measurements in samples of municipality drinking water.⁴⁷

Overall, it appears that lead contamination in the LPRSA had numerous sources, including significant municipal and aerial deposition sources, as well as industrial inputs both above and below Dundee Dam.

Dieldrin

Dieldrin is an organochlorine pesticide as well as a metabolite (particularly when sunlight and bacteria are present) of the pesticide aldrin. Like DDX contaminants, dieldrin will tend to adsorb to organic matter or suspended particles.⁴⁸

The 2014 Remedial Investigation analyzed dated sediment core samples for dieldrin, finding peak concentrations during the 1960s. Related to this time period, the Remedial Investigation also found concentrations at RM 11 and RM 12.6 that were five times the concentrations found downstream, indicating an upstream source during this time. While dieldrin concentrations declined somewhat after the 1960s, the concentrations then increased by a factor of five during the 1985 to 2007 time-frame. Further testing indicates “substantive” ongoing dieldrin sources from the Upper Passaic River, estimated to be the largest source, as well as the tributary Saddle River and Third River.⁴⁹ The Remedial Investigation concludes, “Dieldrin concentrations have been rising since reaching a minimum in the mid-1980s, and much of the dieldrin likely originates from the Upper Passaic River, with minor contributions from tributaries to the Lower Passaic

⁴⁷ Water distribution system sampling data provided by 16 municipal water systems in the PVSC service district show varying levels of copper, lead and mercury at various times since 1983, the earliest data provided in response to New Jersey Open Public Record Act requests made in 2019.

⁴⁸ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, pp. 5-6 to 5-7.

⁴⁹ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, Appendix A, Data Evaluation Report No. 3: “Contaminant History as Recorded in the Sediments,” pp. 3-15 to 3-17.

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River.”⁵⁰ For recently deposited sediments, the Remedial Investigation identifies the Upper Passaic River as the major source for this COC.⁵¹

PAHs

PAHs (polycyclic or polynuclear aromatic hydrocarbons) represent hundreds of low-to-high molecular weight compounds comprised of two or more connected aromatic rings of carbon and hydrogen. PAHs form during incomplete combustion of organic material. PAHs are hydrophobic, and tend to sorb onto organic carbon or other particles, with about two-thirds associated with particles (sediments or suspended particles) in a water system and one-third in dissolved state.⁵²

In cooperation with EPA, NYAS investigated sources of PAHs to the New York/New Jersey Harbor watershed. The finding was that the vast majority of PAHs in the watershed result from aerial deposition (814,000 kg/yr or 82 percent), followed by land discharges (11,400 kg/yr or 18 percent) and water discharges (1,800 kg/yr or less than 1 percent). Results of the analysis are summarized in Figure 1 below.⁵³ Quantities of PAHs released to the watershed by major source are shown below in table PAH1.⁵⁴

⁵⁰ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 4-39.

⁵¹ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 4-58.

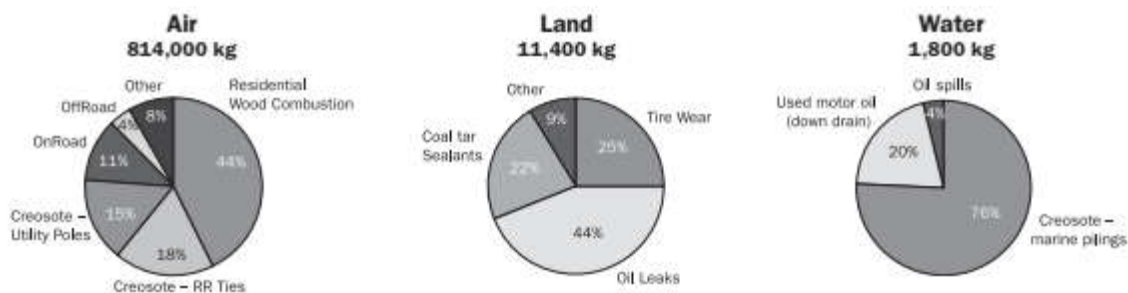
⁵² S. Valle, M.A. Panero, and L. Shor, New York Academy of Sciences, Pollution Prevention and Management Strategies for Polycyclic Aromatic Hydrocarbons in the New York/New Jersey Harbor, September 2007, pp. 39-41 ;The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, Appendix A, Data Evaluation Report No. 3: “Contaminant History as Recorded in the Sediments,” pp. 3-13 to 3-15.

⁵³ S. Valle, M.A. Panero, and L. Shor, New York Academy of Sciences, Pollution Prevention and Management Strategies for Polycyclic Aromatic Hydrocarbons in the New York/New Jersey Harbor, September 2007, pp.21 and Figure 2, p. 27.

⁵⁴ S. Valle, M.A. Panero, and L. Shor, New York Academy of Sciences, Pollution Prevention and Management Strategies for Polycyclic Aromatic Hydrocarbons in the New York/New Jersey Harbor, September 2007, Figure 1, p. 21.

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Figure PAH1. Relative Releases of PAHs by Primary Medium of Release

Other air and land releases refer to sources that individually contribute 2% or less to total releases to the respective medium. These include industrial sources, residential and commercial fossil fuel combustion, open burning of household waste and tires, other transportation-related sources (e.g., vessel and personal boats, locomotive, airplane), and PAHs in ash residue that is sequestered in a landfill.

*Average of the estimated range of releases.

Table PAH1. Estimated Ongoing PAH Releases to NY/NJ Harbor Watershed (kg/yr)⁵⁵

Source	Mass Released (kg/yr)
Residential Fuel Combustion	341,200
Materials Containing PAHs:	
Creosote: utility poles	122,200
Creosote: railway ties	291,600
Creosote: marine pilings	1,600
Refined coal tar sealant	900-5,800
Transportation:	
Vehicle exhaust	2,800
Tire wear	91,500
Oil leaks	5,000
Improper disposal of used motor oil (down drain)	400
Nonroad internal combustion	32,500
Oil Spills and Dumping	70

⁵⁵ S. Valle, M.A. Panero, and L. Shor, New York Academy of Sciences, Pollution Prevention and Management Strategies for Polycyclic Aromatic Hydrocarbons in the New York/New Jersey Harbor, September 2007, Table 2, p.26.

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Additional sources of PAHs that were not quantified in the above table include structural and vehicle fires, asphalt pavement and roofs, leaking underground storage tanks, commercial char-broilers, fireworks, and campfires.⁵⁶

Some PAHs are the result of intentional industrial manufacture. One example is the industrial production of naphthalene, which is used in mothballs, paint thinners, solvents for metal surface preparations, as well as in processes in pharmaceuticals, photographic, soap, pigment and dye, insecticide, fungicide, plastics, and food industries. Other smaller PAH industrial products include acenaphthene (pigments), anthracene (dyes, wood preservatives), fluorene (oxidizing agent), phenanthrene (pesticides, resins), and pyrene (dyes).⁵⁷

While NYAS examined PAH sources to the larger New York/New Jersey Watershed, EPA has examined PAH sources to the LPRSA. By examining sediment cores from the LPRSA, the 2014 Remedial Investigation determined that PAHs were present in almost all samples at all depths. While PAH concentrations increased slightly at depth, there was no decline for the deepest sediments, suggesting a fairly continuous sourcing of PAHs over time. Depth measurements of PAHs concentrations in sediment cores indicate that maximum discharges occurred prior to 1950. Heavy-molecular-weight PAHs (*e.g.*, benzo[a]pyrene, fluoranthene) comprised about 80 percent of Total PAHs, with low-molecular-weight PAHs (*e.g.*, phenanthrene) accounting for the rest.⁵⁸

The 2014 Remedial Investigation for the LPRSA also identifies continuing loads of PAHs to the LPRSA, with sources coming from the Upper Passaic River: “PAHs contamination showed no decline with time since about 1970 and appears to be controlled by external loads originating in

⁵⁶ S. Valle, M.A. Panero, and L. Shor, New York Academy of Sciences, Pollution Prevention and Management Strategies for Polycyclic Aromatic Hydrocarbons in the New York/New Jersey Harbor, September 2007, Table 2, p.88.

⁵⁷ S. Valle, M.A. Panero, and L. Shor, New York Academy of Sciences, Pollution Prevention and Management Strategies for Polycyclic Aromatic Hydrocarbons in the New York/New Jersey Harbor, September 2007, Table 2, p.47.

⁵⁸ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 5-8.

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the Upper Passaic River.”⁵⁹ For recently deposited sediments, the Remedial Investigation identifies the Upper Passaic River as a major source for this COC.⁶⁰ The Remedial Investigation concludes: “[T]he sources of PAH contamination to the Lower Passaic River are not abating.”⁶¹

Overall, it appears that PAH contamination in LPRSA sediments are largely from non-industrial sources. The Upper Passaic River also continues to serve as a major ongoing source of this COC.

⁵⁹ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 4-39.

⁶⁰ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, p. 4-58.

⁶¹ The Louis Berger Group, Battelle, and HDR/HydroQual, *Lower Eight Miles of the Lower Passaic River: Remedial Investigation Report for the Focused Feasibility Study*, prepared for EPA, 2014, Appendix A, Data Evaluation Report No. 3: “Contaminant History as Recorded in the Sediments,” pp. 3-13 to 3-15.

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APPENDIX C
EXAMPLES OF NON-PARTICIPATING COMPANIES
THAT LIKELY DISCHARGED PCBs

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Examples of Non-Participating PCB Parties in the Allocation

Examples of potentially major PCB-discharging facilities that are not a part of this allocation effort include (but are not limited to):

- **Cargille Laboratories** (aka Cargille Labs, R.P. Cargille Laboratories, Cargille & Sons, Cargille-Sacher Laboratories, Cargille Scientific) started operations in 1924 to manufacture optical fluids and immersion oils and provide products to the laboratory science industry. Operations included four facilities in Little Falls (194 Second Avenue, 9 Railroad Avenue) and Cedar Grove (33 Village Park Road, 55 Commerce Road), New Jersey, with operations presently continuing at 55 Commerce Road in Cedar Grove, New Jersey.¹ The four facilities were located in areas serviced by the Passaic Valley Sewerage Commission ("PVSC") and were located near the Passaic River or its tributaries (for example, Peckman River in Cedar Grove). Untreated wastes from these facilities would have been discharged to the Passaic River whenever the Yantacaw Bypass was opened to the river, *i.e.*, during heavy rains and maintenance/repair activities. R.P. Cargille Laboratories used PCBs as a major component of its immersion oils. When it filed for an immersion oil formulation patent in 1974, the company stated that "the vast majority of such prior art oils contain polychlorinated biphenyls (PCBs)...The prior art formulations typically contained a polychlorinated biphenyl which was blended or mixed with a mineral oil and viscosity adjusting agents to provide a good operating characteristic immersion oil..."² Cargille is documented as having purchased 66,662 pounds of PCBs during 1968-1972.³ The company continues to store PCBs at its current location under a storage-and-use exemption from EPA.⁴ PCBs, metals, and PAHs have been identified in site soils at

¹ *New Jersey Industrial Directory*, 1960-61, p. B-378; *New Jersey State Industrial Directory*, 1964, p. B-104; Deed, Cargille Sons, Inc., October 29, 1974; Cargille Laboratories response to EPA Request for Information regarding the Lower Passaic River Study Area, September 30, 2008.

² Immersion Oil Formulations for Use in Microscopy and Similar Fields, United States Patent No. 3,929,667, December 30, 1976

³ Monsanto Sales Summaries, RP Cargille, 1968-1972.

⁴ Cargille Laboratories response to EPA Request for Information regarding the Lower Passaic River Study Area, September 30, 2008; 40 CFR Ch. I, §761.80, July 1, 2005.

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the current facility at levels exceeding New Jersey Soil Remediation Standards.⁵ The facility is upgradient and adjacent to the Peckman River (tributary to the Passaic River), which has also been noted as contaminated with PCBs.⁶

- **Hardman Inc.**, a company that has manufactured adhesives in Belleville, New Jersey since the late 1800s, should be considered a potentially responsible party ("PRP") for PCBs in the LPRSA. By the mid-1950s, the company was located on Cortlandt Street in Belleville, and is documented at its present location of 600 Cortlandt Street by 1967. Available sales records show that the facility purchased 32,100 pounds of PCBs during 1968 to 1972. The facility is located near the Passaic River, so there was a potential for direct discharge to the river. The facility is also served by the Passaic Valley Sewer Commission ("PVSC"), which routinely discharged untreated waste directly to the river. Hardman continues to operate its facility at 600 Cortlandt Street in Belleville, and is owned by Royal Adhesives and Sealants LLC.
- **Universal Manufacturing**, a manufacturer of fluorescent transformers, capacitors, and ballasts, operated at two facilities: (1) from 1951 to 1989 in Paterson, New Jersey (29-51 East 6th Street) near the Passaic River and the East Fifth Street and Fifth Avenue CSO, and (2) from approximately 1971 to 1989 in Totowa, New Jersey (111 Jackson Road).⁷ Available PCB sales records show that Universal Manufacturing's Totowa facility received over 6 million pounds of PCB products during 1971 to 1977.⁸ EPA documented that Universal Manufacturing used PCBs in its capacitors, ranking the company as the third highest user of PCBs for this purpose.⁹ Universal Manufacturing's patents also indicate the use of metals throughout its operations, including solder which could be a source of lead.¹⁰

⁵ NJDEP Receptor Evaluation (RE) Form, Cargille Sons, 2016; Cargille Laboratories letter to NJDEP, July 14, 2016.

⁶ EPA, Water Quality Assessment Report, 2014 Waterbody Report for Peckman River; EPA, 303(d) Impaired Waterbody History Report, Peckman River, 2014.

⁷ *New Jersey Industrial Directory plus the New Jersey Industrial Market Place*, 1960-1961, p. B-419; *1970 New Jersey State Industrial Directory*, p. G-361; *1974 New Jersey State Industrial Directory*, p. G-350; *1980 New Jersey State Industrial Directory*, p. G-367; W.M. Adler, "A Job on the Line," *Mother Jones*, March/April 2000.

⁸ Monsanto Sales Summaries, Univ Mfg Corp, 1971-1977.

⁹ EPA, PCBs in the United States Industrial Use and Environmental Distribution, Task I, February 25, 1976, Table 3.1.1-1, p. 69.

¹⁰ Thermal Protective Arrangement for Inductive Devices, U.S. Patent 3,275,774, September 27 1966; Feed Through Insulator, U.S. Patent 3,329,762, July 4, 1967; Ballast Apparatus Using Leakage Reactance of Split Primary

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The company's Paterson facility was located near the Passaic River and on the East Fifth Street and Fifth Avenue CSO, which had a projection of 60-65 overflows per year in 1975.¹¹ According to the PVSC's 1977 Industrial Waste Survey, with a discharge of 50,000 gallons per day or more, Universal Manufacturing was classified as a major contributor of industrial waste to the sewers.¹² In addition to routine overflows of waste into the Passaic River through the CSO, Universal Manufacturing's untreated waste would have been directed to the river when (1) the City of Paterson bypassed untreated waste to the river during maintenance and storm bypass events, and (2) the PVSC bypassed untreated waste to the river during maintenance and storm bypass events, both at the Fifth Avenue CSO and at the Yantacaw Bypass. Universal Manufacturing's Paterson facility was also identified by the PVSC as having a pollution violation to the Passaic River (or its tributaries) in 1978.¹³

The Totowa facility was located on Naachtpunkt Brook, a tributary to the Passaic River, and the sewers in Totowa discharged into the PVSC main interceptor. The facility's wastes would have been discharged untreated to the Passaic River through the Yantacaw bypass when opened by the PVSC.¹⁴ EPA also identified the Universal Manufacturing Totowa facility as directly discharging PCBs into tributaries of the Passaic River.¹⁵ Columbus McKinnon

Winding, U.S. Patent 3,418,527, December 24, 1968; Clamp and Laminations, U.S. Patent 3,474,371, October 21, 1969; Metallized Film Capacitor, U.S. Patent 4,897,761

¹¹ Elson T. Killam Associates, Report Upon Overflow Analysis to the Passaic Valley Sewerage Commissioners, Passaic River Overflows, Paterson Area, 1976; Elson T. Killam Associates, Report Upon Overflow Analysis to the Passaic Valley Sewerage Commissioners, Passaic River Overflows, East 5th St. & 5th Ave., Paterson, 1976.

¹² PVSC, Semi-Annual Report, Industrial Waste Survey, September 30, 1977.

¹³ PVSC, Annual Report of the PVSC for the Year 1978, Report of River Inspection Department, p. 20.

¹⁴ Map of 111 Jackson Road, Totowa, NJ, Google Maps, retrieved from <https://www.google.com/maps/place/111+Jackson+Rd,+Totowa,+NJ+07512/@40.9011749,74.2487913,15z/data=!4m5!3m4!1s0x89c3018afdd5684f:0x974c98600e6523fa!8m2!3d40.9085053!4d-74.2440706>; Totowa Sewer Department, retrieved from <http://www.totowanj.org/sewer.html>.

¹⁵ R. Severo, "E.P.A. Aide Warns of Toxic Leakage," *The New York Times*, November 20, 1975. Retrieved from <https://www.nytimes.com/1975/11/20/archives/epa-aide-warns-of-toxic-leakage-says-10-million-pounds-of-pcb.html>.

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Corporation of Getzville, New York, appears to be the viable successor to Universal Manufacturing via its acquisition of Magnetek.¹⁶

Prior research indicates that there are numerous insolvent PRPs that handled PCBs in the areas served by the PVSC system, whose bypasses and CSOs discharged untreated waste to the Passaic River. Examples of such insolvent PRPs, for which the PVSC serves as the last viable allocable party through its arranger/transporter roles, include (but are not limited to) the following entities, whose PCB usage is described below:

- *Atlantic Chemical Corp.* was located at 153 Prospect Street, Passaic, N.J. (with a laboratory located at 10 Kingsland Road, Nutley, N.J.). This company researched and produced coal tar dyestuffs, organic intermediates, and fine organics.¹⁷ The facility in Passaic purchased 24,000 pounds of PCBs (Aroclor 1248) between 1962 and 1965.¹⁸ The Passaic and Nutley facilities were located in municipalities that joined the PVSC in 1911 and whose waste would have flowed through the Yantacaw Bypass when the PVSC bypassed untreated waste to the Passaic. Atlantic Chemical Corp. eventually became part of Chemtura (via Crompton & Knowles, Witco Corporation, Crompton Corporation, and Great Lakes Chemical Corporation), which filed for bankruptcy in 2009.¹⁹
- *Garden State Paper* was located at 950 River Drive in Garfield, N.J., where it recycled paper. PCBs are a common contaminant in historical paper recycling operations.²⁰ A

¹⁶ Columbus McKinnon Corporation, 2016 Annual Report and 10-K; Attachment 2 - Columbus McKinnon Corp, Form 10-K, 2017.

¹⁷ *Industrial Research Laboratories of the United States*, Washington, D.C.: National Academy of Sciences - National Research Council, eleventh edition, 1960, p. 44.

¹⁸ Monsanto PCB Sales records [LPCPG0000640 and 0000649].

¹⁹ "Chemtura Files for Bankruptcy," *The New York Times*, March 19, 2009.

²⁰ EPA, *PCBs in the United States Industrial Use and Environmental Distribution: Task I*, February 25, 1976, pp. 129-139.

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PVSC diagram identifies Garden State Paper as linked to the PVSC's Yantacaw bypass.²¹ Garden State Paper filed for bankruptcy in 2001.²²

- *Maas & Waldstein*, located at 437 Riverside Avenue, Newark, N.J. which later became 2121 McCarter Highway, in the area serviced by the Verona Avenue, Newark bypass operated by the PVSC. The company manufactured coatings, lacquers, colors, flavors, and explosives.²³ Available PCB sales records show that the facility purchased 9,380 pounds of PCBs (Aroclors 1221, 1254 and 5460 Hi Sol) between 1964 and 1971.²⁴ The company was dissolved in 1993.²⁵
- *Marcal Paper Mills* was located at 1 Market Street in Elmwood Park, N.J., starting in 1932 as the largest paper recycler in the state. PCBs are a common contaminant in historical paper recycling operations.²⁶ A PVSC diagram identifies Marcal Paper as linked to the PVSC's Yantacaw bypass.²⁷ Marcal was the recipient of regulatory enforcement actions in 1991 and 1994 as a result of its handling of PCBs.²⁸ The company completed bankruptcy proceedings in 2007, committing the reorganized company to clean up onsite contamination but releasing it from contamination of the Passaic River.²⁹

²¹ Manganaro, Martin and Lincoln, Schematic Diagram of Existing Metering System [LPRSA0046087; LPRSA 0239267].

²² Rosenberg, J. "Enron N.J. Mill Files for Chap. 11," *Editor & Publisher*, December 18, 2001, accessed at <http://www.editorandpublisher.com/news/enron-n-j-mill-files-for-chap-11/>.

²³ *Industrial Research Laboratories of the United States*, Washington, D.C.: National Academy of Sciences - National Research Council, eleventh edition, 1960, p. 300; Baptista, R.J., "Maas & Waldstein Company, Newark, New Jersey," April 5, 2011, accessed at <http://www.colorantshistory.org/MaasWaldstein.html>.

²⁴ Monsanto PCB sales records [LPRSA0041661, 0041661, 0041710, 0041723, and 0041810 and LPCPG0000417, 437, 457, 481, and 540].

²⁵ "Maas & Waldstein Company," Company-detail.com, accessed at <https://www.company-detail.com/company-maas-amp-waldstein-company-26396>.

²⁶ EPA, *PCBs in the United States Industrial Use and Environmental Distribution: Task I*, February 25, 1976, pp. 129-139.

²⁷ Manganaro, Martin and Lincoln, Schematic Diagram of Existing Metering System [LPRSA0046087; LPRSA 0239267].

²⁸ EDR, DataMap Environmental Atlas, June 18, 2015, Inquiry Number 4139330.2s, p. 19279/66158.

²⁹ "Marcal Paper Mills, Inc. Settles Claim with Environmental Protection Agency: Company Remains on Target for September Emergence from Chapter 11," *PR Newswire*, July 26, 2007, accessed at <http://www.prnewswire.com/news-releases/marcal-paper-mills-inc-settles-claim-with-environmental->

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- *Sonneborn Chemical and Refining Corporation* was located in Belleville, N.J.,³⁰ a municipality that contracted to join the PVSC system in 1911. The facility purchased 975,900 pounds of PCBs (Aroclors 1242, 1248, 1254, 1260, 1262, 1268, 1268, and 5460 Hi Sol) during 1968-1971.³¹ Sonneborn merged into Witco Corporation, which ultimately became part of Chemtura.³² Chemtura filed for bankruptcy in 2009.³³
- *U.S. Rubber* produced rubber at a facility located on Passaic and Market Streets in Passaic, N.J.,³⁴ a municipality that joined the PVSC in 1911 and whose waste would have been discharged through the Yantacaw Bypass when the PVSC opened it. The facility purchased 20,050 pounds of PCBs (Aroclors 1232 and 1242 and Therminol FR-2) during 1962-1964.³⁵ U.S. Rubber changed its name to Uniroyal,³⁶ which sold the Passaic facility in 1977³⁷ and filed for bankruptcy in 2002.³⁸

protection-agency-52777102.html; Term Sheet -- NJDEP & NEWCO, November 5, 2007, accessed at <http://www.state.nj.us/dep/srp/legal/marcal200804summary.pdf>.

³⁰ *Industrial Research Laboratories of the United States*, Washington, D.C.: National Academy of Sciences - National Research Council, eleventh edition, 1960, p. 431.

³¹ Monsanto PCB sales records [LPRSA0041666, 0041667, 0041680, 0041697, 0041713, and 0041816 and LPCPG0000016, 017, 020, 021, 022, 023, 027, 018, 029, 031, and 033].

³² W. Saxon, "Rudolf Sonneborn Dies at 87," *The New York Times*, June 4, 1986; Witco Corporation, *NNDB*, 2012, accessed at <http://www.nndb.com/company/844/000126466/>.

³³ "Chemtura Files for Bankruptcy," *The New York Times*, March 19, 2009.

³⁴ DePalma, A., "New Life for Old Uniroyal Complex," *The New York Times*, March 4, 1984, accessed at <http://www.nytimes.com/1984/03/04/realestate/new-life-for-old-uniroyal-complex.html>.

³⁵ Monsanto PCB sales records [LPCPG0000638, 639, 642, and 645].

³⁶ S. Jacob, *The United States and the Malaysian Economy*, 2008, New York: Routledge, p. 159.

³⁷ DePalma, A., "New Life for Old Uniroyal Complex," *The New York Times*, March 4, 1984, accessed at <http://www.nytimes.com/1984/03/04/realestate/new-life-for-old-uniroyal-complex.html>.

³⁸ "Uniroyal Technology Corp. Files Voluntary Petitions for Reorganization, Receives Commitment for up to \$15 Million in Financing," *PR Newswire*, August 26, 2002, accessed at <http://www.prnewswire.com/news-releases/uniroyal-technology-corp-files-voluntary-petitions-for-reorganization-receives-commitment-for-up-to-15-million-in-financing-76838592.html>.

ATTACHMENT P
BYPASS VALVE WORKSHEETS

ARR3177

SUMMARY			
Documented PVSC Bypasses Outlets	Total Time of Bypasses	Total Time Observed	Bypass % total time
Union	14346:34:00	115597:50:00	12.41%
Verona	8484:45:00	106697:00:00	7.95%
4th Avenue	13470:30:00	115604:30:00	11.65%
Clay Street	14505:04:12	114845:10:00	12.63%
City Dock	8695:55:00	87155:30:00	9.98%
Polk	13647:55:00	115069:30:00	11.86%
Yantacaw	2465:40:00	106063:15:00	2.32%

Exhibit 1a. Documented PVSC Bypasses at Union Outlet
(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark,West Orange, Little Falls)

Allocation Report			
	Time of bypasses	Time observed	% of Total Time
1950-1962	13749:54:00	107269:50:00	12.82%
1974-1975	596:40:00	8328:00:00	7.16%
Total	14346:34:00	115597:50:00	12.41%

Koch report 1950-1962 (PAP-00488396 - PAP-00488405)					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates Number (throw-out logs)	Comments
10/4/1950 22:00	10/5/1950 11:30	13:30:00	LPRSA0188654	PAP-00456047-048; PAP-00456399	
10/10/1950 2:30	10/10/1950 8:30	6:00:00	LPRSA0188652	PAP-00456397	
10/12/1950 13:30	10/13/1950 9:30	20:00:00	LPRSA0188650	PAP-00456049; PAP-00456395	
10/23/1950 13:30	10/24/1950 9:00	19:30:00	LPRSA0188648	PAP-00456393	
11/20/1950 18:00	11/21/1950 9:00	15:00:00	LPRSA0188646	PAP-00456051; PAP-00456391	
11/25/1950 9:00	11/25/1950 13:00	4:00:00	LPRSA0188643	PAP-00456053; PAP-00456388	
12/4/1950 12:30	12/4/1950 21:00	8:30:00	LPRSA0188641	PAP-00456056; PAP-00456386	
12/7/1950 16:00	12/8/1950 11:30	19:30:00	LPRSA0188637	PAP-00456058; PAP-00456382	
12/15/1950 22:30	12/16/1950 9:00	10:30:00	LPRSA0188639	PAP-00456060; PAP-00456384	
12/29/1950 12:30	12/30/1950 11:30	23:00:00	LPRSA0188635	PAP-00456062; PAP-00456380	
1/7/1951 17:00	1/8/1951 9:00	16:00:00	LPRSA0188633	PAP-00456074; PAP-00456378	
1/11/1951 17:30	1/12/1951 8:30	15:00:00	LPRSA0188619	PAP-00456076; PAP-00456364	
1/14/1951 18:00	1/15/1951 12:00	18:00:00	LPRSA0188631	PAP-00456078; PAP-00456376	
1/23/1951 2:00	1/24/1951 14:00	36:00:00	LPRSA0188621	PAP-00456080; PAP-00456366	
1/25/1951 16:00	1/25/1951 19:00	3:00:00	LPRSA0188623	PAP-00456072; PAP-00456368	
1/28/1951 17:00	1/29/1951 8:30	15:30:00	LPRSA0188625	PAP-00456370	
1/29/1951 19:30	1/30/1951 10:00	14:30:00	LPRSA0188625	PAP-00456370	
1/31/1951 16:00	2/1/1951 15:00	23:00:00	LPRSA0188628	PAP-00456082; PAP-00456373	

**Exhibit 1a. Documented PVSC Bypasses at Union Outlet
(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)**

2/7/1951 11:00	2/7/1951 19:30	8:30:00	LPRSA0188585	PAP-00456085; PAP-00456330	
2/10/1951 5:30	2/10/1951 12:00	6:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/11/1951 18:00	2/13/1951 8:30	38:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/13/1951 19:45	2/14/1951 10:00	14:15:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/14/1951 17:45	2/15/1951 9:30	15:45:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/17/1951 4:00	2/17/1951 22:00	18:00:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/19/1951 17:00	2/20/1951 9:30	16:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
2/20/1951 16:00	2/21/1951 17:30	25:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
2/22/1951 10:30	2/22/1951 11:45	1:15:00	LPRSA0188596	PAP-00456064; PAP-00456341	
2/23/1951 8:30	2/23/1951 10:00	1:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
2/23/1951 15:00	2/23/1951 15:30	0:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
	2/24/1951 9:30		LPRSA0188596	PAP-00456064; PAP-00456341	
3/1/1951 14:30	3/2/1951 10:00	19:30:00	LPRSA0188604	PAP-00456349	
3/3/1951 15:00	3/5/1951 10:30	43:30:00	LPRSA0188606	PAP-00456351	
3/13/1951 16:30	3/14/1951 15:00	22:30:00	LPRSA0188609	PAP-00456354	
3/16/1951 16:00	3/19/1951 9:30	65:30:00	LPRSA0188612	PAP-00456357	
3/19/1951 17:00	3/20/1951 12:00	19:00:00	LPRSA0188616	PAP-00456361	
3/22/1951 0:00	12/31/1951 23:59				
2/17/1952 2:00	2/18/1952 9:00	31:00:00	LPRSA0189755	PAP-00456150	
2/20/1952 16:00	2/21/1952 8:00	16:00:00	LPRSA0189754	PAP-00456149	
2/29/1952 18:00	3/1/1952 9:00	15:00:00	LPRSA0189753	PAP-00456148	
3/1/1952 11:00	3/3/1952 9:00	46:00:00	LPRSA0189753	PAP-00456148	
3/3/1952 16:30	3/4/1952 8:00	15:30:00	LPRSA0189753	PAP-00456148	
3/4/1952 16:00	3/5/1952 8:30	16:30:00	LPRSA0189753	PAP-00456148	
3/5/1952 16:00	3/6/1952 8:00	16:00:00	LPRSA0189753	PAP-00456148	
3/11/1952 2:00	3/17/1952 13:00	155:00:00	LPRSA0189752	PAP-00456147	
3/19/1952 9:00	3/19/1952 18:30	9:30:00	LPRSA0189751	PAP-00456146	
3/22/1952 15:00	3/24/1952 9:00	42:00:00	LPRSA0189750	PAP-00456145	
3/24/1952 18:00	3/25/1952 9:00	15:00:00	LPRSA0189750	PAP-00456145	
4/4/1952 16:30	4/6/1952 8:30	40:00:00	LPRSA0189749	PAP-00456144	
4/14/1952 1:00	4/14/1952 10:00	9:00:00	LPRSA0189748	PAP-00456143	
4/14/1952 14:00	4/14/1952 15:30	1:30:00	LPRSA0189748	PAP-00456143	
4/23/1952 16:30	4/24/1952 8:30	16:00:00	LPRSA0189747	PAP-00456142	

**Exhibit 1a. Documented PVSC Bypasses at Union Outlet
(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)**

4/25/1952 8:00	4/25/1952 19:00	11:00:00	LPRSA0189744	PAP-00456139	
4/26/1952 10:00	4/28/1952 10:30	48:30:00	LPRSA0189744	PAP-00456139	
4/29/1952 16:15	4/30/1952 9:00	16:45:00	LPRSA0189745	PAP-00456140	
5/5/1952 9:00	5/5/1952 16:30	7:30:00	LPRSA0189745	PAP-00456140	
5/6/1952 15:00	5/6/1952 21:30	6:30:00	LPRSA0189745	PAP-00456140	
5/11/1952 21:00	5/12/1952 9:00	12:00:00	LPRSA0189743	PAP-00456138	
5/12/1952 15:00	5/12/1952 16:15	1:15:00	LPRSA0189743	PAP-00456138	
5/13/1952 14:00	5/14/1952 8:00	18:00:00	LPRSA0189743	PAP-00456138	
5/18/1952 7:00	5/19/1952 9:00	26:00:00	LPRSA0189741	PAP-00456136	
5/19/1952 18:00	5/20/1952 14:30	20:30:00	LPRSA0189741	PAP-00456136	
5/21/1952 15:15	5/22/1952 9:00	17:45:00	LPRSA0189741	PAP-00456136	
5/22/1952 15:30	5/23/1952 13:30	22:00:00	LPRSA0189742	PAP-00456137	
5/25/1952 8:00	5/25/1952 13:30	5:30:00	LPRSA0189740	PAP-00456135	Start time difficult to read on throw out log. Defaulted to Koch report
5/26/1952 10:00	5/27/1952 8:00	22:00:00	LPRSA0189740	PAP-00456135	
5/31/1952 3:30	5/31/1952 8:00	4:30:00	LPRSA0189738	PAP-00456133	
6/2/1952 14:30	6/3/1952 9:00	18:30:00	LPRSA0189738	PAP-00456133	
6/4/1952 20:00	6/6/1952 9:00	37:00:00	LPRSA0189736	PAP-00456131	
6/9/1952 8:00	6/10/1952 16:30	32:30:00	LPRSA0189736	PAP-00456131	
6/11/1952 13:45	6/11/1952 16:45	3:00:00	LPRSA0189737	PAP-00456132	
6/17/1952 16:30	6/17/1952 20:45	4:15:00	LPRSA0189735	PAP-00456130	
6/19/1952 16:15	6/20/1952 10:45	18:30:00	LPRSA0189734	PAP-00456129	
6/27/1952 15:30	6/28/1952 8:00	16:30:00	LPRSA0189729	PAP-00456124	
6/29/1952 0:01	6/30/1952 9:00	32:59:00	LPRSA0189728	PAP-00456123	
7/8/1952 15:30	7/10/1952 9:00	41:30:00	LPRSA0189730	PAP-00456125	
7/21/1952 15:30	7/22/1952 9:30	18:00:00	LPRSA0189726	PAP-00456121	
7/31/1952 16:00	8/1/1952 9:00	17:00:00	LPRSA0189724	PAP-00456119	
8/2/1952 15:30	8/3/1952 8:30	17:00:00	LPRSA0189725	PAP-00456120	
8/6/1952 14:00	8/6/1952 19:30	5:30:00	LPRSA0189715	PAP-00456110	
8/8/1952 13:00	8/9/1952 14:00	25:00:00	LPRSA0189715	PAP-00456110	
8/10/1952 8:30	8/11/1952 8:00	23:30:00	LPRSA0189716	PAP-00456112-113	
8/11/1952 16:30	8/12/1952 8:00	15:30:00	LPRSA0189719	PAP-00456114-115	
8/12/1952 16:00	8/13/1952 8:00	16:00:00	LPRSA0189721	PAP-00456116-117	
8/13/1952 16:00	8/14/1952 8:00	16:00:00	LPRSA0189720	PAP-00456117-118	
8/15/1952 16:00	8/17/1952 8:00	40:00:00	LPRSA0189714	PAP-00456109	
8/21/1952 15:30	8/22/1952 9:00	17:30:00	LPRSA0189713	PAP-00456108	
8/30/1952 9:00	9/2/1952 8:00	71:00:00	LPRSA0189712	PAP-00456107	
9/2/1952 16:00	9/3/1952 13:00	21:00:00	LPRSA0189711	PAP-00456106	
9/15/1952 15:00	9/17/1952 16:00	49:00:00	LPRSA0189709	PAP-00456104	
9/18/1952 12:00	9/20/1952 8:00	44:00:00	LPRSA0189710	PAP-00456105	
9/23/1952 9:30	9/23/1952 13:00	3:30:00	LPRSA0189708	PAP-00456103	
10/2/1952 18:00	10/2/1952 21:30	3:30:00	LPRSA0189707	PAP-00456102	
10/28/1952 16:30	10/29/1952 8:00	15:30:00	LPRSA0189706	PAP-00456101	
11/2/1952 8:15	11/2/1952 13:15	5:00:00	LPRSA0189705	PAP-00456100	

Exhibit 1a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

11/3/1952 13:00	11/4/1952 8:00	19:00:00	LPRSA0189703	PAP-00456098	
11/10/1952 15:30	11/11/1952 8:00	16:30:00	LPRSA0189704	PAP-00456099	
11/14/1952 15:15	12/1/1952 12:45	405:30:00	LPRSA0189701	PAP-00456096	
12/2/1952 13:00	12/5/1952 17:00	76:00:00	LPRSA0189702	PAP-00456097	
12/9/1952 10:30	1/18/1953 16:15	965:45:00	LPRSA0189655	PAP-00456556	
1/21/1953 14:00	1/22/1953 8:00	18:00:00	LPRSA0189656	PAP-00456557	
1/24/1953 9:00	1/24/1953 15:00	6:00:00	LPRSA0189657	PAP-00456558	
2/11/1953 16:30	2/13/1953 9:30	41:00:00	LPRSA0189658	PAP-00456559	
2/15/1953 10:00	2/15/1953 15:30	5:30:00	LPRSA0189659	PAP-00456560	
2/21/1953 8:00	2/21/1953 13:30	5:30:00	LPRSA0189660	PAP-00456561	
2/25/1953 8:00	3/10/1953 19:00	323:00:00	LPRSA0189661	PAP-00456562	
3/14/1953 12:00	3/15/1953 14:30	26:30:00	LPRSA0189663	PAP-00456154	Throw out log difficult to decipher. Used data in Koch report
3/16/1953 0:00	3/23/1953 13:00	181:00:00	LPRSA0189663	PAP-00456154	Unable to verify start time on throw out log. Used data in Koch report
3/24/1953 8:45	3/24/1953 16:00	7:15:00	LPRSA0189663	PAP-00456154	
3/25/1953 13:30	3/25/1953 19:30	6:00:00	LPRSA0189663	PAP-00456154	
3/27/1953 13:00	3/28/1953 19:00	30:00:00	LPRSA0189663	PAP-00456154	
3/30/1953 13:45	3/31/1953 9:00	19:15:00	LPRSA0189663	PAP-00456154	
3/31/1953 16:30	4/6/1953 9:00	136:30:00	LPRSA0189663	PAP-00456154	
4/6/1953 16:30	4/10/1953 13:30	93:00:00	LPRSA0189663	PAP-00456154	
4/11/1953 11:30	4/13/1953 9:30	46:00:00	LPRSA0189663	PAP-00456154	
4/13/1953 14:15	4/14/1953 8:30	18:15:00	LPRSA0189663	PAP-00456154	
4/14/1953 11:30	4/15/1953 9:00	21:30:00	LPRSA0189663	PAP-00456154	
4/15/1953 11:30	4/16/1953 14:30	27:00:00	LPRSA0189663	PAP-00456154	
4/16/1953 16:00	4/17/1953 8:00	16:00:00	LPRSA0189663	PAP-00456154	
4/17/1953 13:00	4/23/1953 13:00	144:00:00	LPRSA0189663	PAP-00456154	
4/29/1953 15:30	4/30/1953 8:00	16:30:00	LPRSA0189663	PAP-00456154	
4/30/1953 15:30	5/1/1953 11:30	20:00:00	LPRSA0189663	PAP-00456154	
5/1/1953 14:45	5/4/1953 8:30	65:45:00	LPRSA0189663	PAP-00456154	
5/5/1953 13:00	5/8/1953 9:00	68:00:00	LPRSA0189663	PAP-00456154	
5/8/1953 21:00	5/9/1953 8:00	11:00:00	LPRSA0189663	PAP-00456154	
5/13/1953 21:30	5/14/1953 9:00	11:30:00	LPRSA0189663	PAP-00456154	
5/14/1953 15:00	5/15/1953 9:45	18:45:00	LPRSA0189663	PAP-00456154	
5/15/1953 15:30	5/16/1953 8:00	16:30:00	LPRSA0189663	PAP-00456154	
5/18/1953 8:30	5/22/1953 17:45	105:15:00	LPRSA0189663	PAP-00456154	
5/25/1953 9:30	5/25/1953 15:30	6:00:00	LPRSA0189663	PAP-00456154	
5/27/1953 11:00	5/27/1953 13:00	2:00:00	LPRSA0189663	PAP-00456154	
6/1/1953 12:00	6/6/1953 8:00	116:00:00	LPRSA0189663	PAP-00456154	
6/8/1953 13:30	6/11/1953 11:30	70:00:00	LPRSA0189663	PAP-00456154	
6/13/1953 16:30	6/14/1953 13:30	21:00:00	LPRSA0189674	PAP-00456563	
6/18/1953 16:00	6/19/1953 9:00	17:00:00	LPRSA0189676	PAP-00456565	
6/22/1953 9:30	6/22/1953 18:15	8:45:00	LPRSA0189677	PAP-00456566	
6/23/1953 9:30	7/2/1953 13:30	220:00:00	LPRSA0189678	PAP-00456567	
7/6/1953 19:30	7/7/1953 8:00	12:30:00	LPRSA0189681	PAP-00456570	
7/20/1953 21:00	7/21/1953 8:15	11:15:00	LPRSA0189682	PAP-00456571	
7/23/1953 8:30	7/23/1953 15:00	6:30:00	LPRSA0189684	PAP-00456573	

**Exhibit 1a. Documented PVSC Bypasses at Union Outlet
(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)**

8/10/1953 0:45	8/10/1953 8:30	7:45:00	LPRSA0189685	PAP-00456574	
8/14/1953 13:00	8/14/1953 19:30	6:30:00	LPRSA0189686	PAP-00456575	
9/16/1953 1:30	9/16/1953 8:00	6:30:00	LPRSA0189688	PAP-00456576	
10/6/1953 18:00	10/7/1953 8:30	14:30:00	LPRSA0189689	PAP-00456578	
10/22/1953 13:00	10/28/1953 13:45	144:45:00	LPRSA0189691	PAP-00456580	
10/29/1953 13:30	10/30/1953 8:30	19:00:00	LPRSA0189693	PAP-00456582	
11/7/1953 6:30	11/8/1953 14:00	31:30:00	LPRSA0189695	PAP-00456584	
11/16/1953 14:00	11/20/1953 11:30	93:30:00	LPRSA0189696	PAP-00456585	
11/23/1953 9:30	11/23/1953 16:15	6:45:00	LPRSA0189698	PAP-00456587	
11/25/1953 9:30	11/26/1953 8:30	23:00:00	LPRSA0189652	PAP-00456553	
11/30/1953 9:30	12/4/1953 10:30	97:00:00	LPRSA0189651	PAP-00456552	
12/6/1953 9:00	12/7/1953 8:40	23:40:00	LPRSA0189650	PAP-00456551	
12/9/1953 15:20	12/10/1953 11:30	20:10:00	LPRSA0189649	PAP-00456550	
12/12/1953 17:00	12/13/1953 8:00	15:00:00	LPRSA0189648	PAP-00456549	
12/14/1953 5:30	12/14/1953 12:00	6:30:00	LPRSA0189647	PAP-00456548	
12/28/1953 16:15	12/29/1953 9:00	16:45:00	LPRSA0189646	PAP-00456547	
1/14/1954 16:00	1/18/1954 9:00	89:00:00	LPRSA0189592	PAP-00456493	
1/18/1954 14:00	1/21/1954 9:00	67:00:00	LPRSA0189591	PAP-00456492	
1/22/1954 15:30	1/25/1954 9:15	65:45:00	LPRSA0189590	PAP-00456491	
1/25/1954 14:30	1/27/1954 16:00	49:30:00	LPRSA0189590	PAP-00456491	
2/3/1954 12:45	2/4/1954 8:30	19:45:00	LPRSA0189589	PAP-00456490	
2/8/1954 17:00	2/9/1954 9:00	16:00:00	LPRSA0189588	PAP-00456489	
2/16/1954 16:30	2/17/1954 13:15	20:45:00	LPRSA0189587	PAP-00456488	
2/21/1954 16:45	2/22/1954 8:15	15:30:00	LPRSA0189586	PAP-00456487	
2/23/1954 11:15	2/27/1954 8:15	93:00:00	LPRSA0189621	PAP-00456522	
3/1/1954 10:15	3/5/1954 13:00	98:45:00	LPRSA0189619	PAP-00456520	
3/13/1954 14:30	3/15/1954 8:30	42:00:00	LPRSA0189618	PAP-00456519	
3/19/1954 16:00	3/20/1954 8:30	16:30:00	LPRSA0189617	PAP-00456518	
3/25/1954 9:45	3/26/1954 7:45	22:00:00	LPRSA0189616	PAP-00456517	
4/8/1954 13:30	4/8/1954 15:45	2:15:00	LPRSA0189613	PAP-00456514	
4/13/1954 12:00	4/13/1954 16:00	4:00:00	LPRSA0189623	PAP-00456524	
4/16/1954 12:50	4/18/1954 9:45	44:55:00	LPRSA0189632	PAP-00456533	
4/19/1954 17:45	4/21/1954 16:30	46:45:00	LPRSA0189615	PAP-00456516	
4/23/1954 13:00	4/23/1954 16:00	3:00:00	LPRSA0189614	PAP-00456515	
4/28/1954 15:00	4/28/1954 16:45	1:45:00	LPRSA0189612	PAP-00456513	
5/3/1954 10:30	5/22/1954 8:30	454:00:00	LPRSA0189631	PAP-00456532	
6/3/1954 17:00	6/8/1954 16:00	119:00:00	LPRSA0189630	PAP-00456531	
6/23/1954 16:00	6/24/1954 8:00	16:00:00	LPRSA0189628	PAP-00456529	
7/7/1954 16:00	7/8/1954 9:00	17:00:00	LPRSA0189624	PAP-00456525	
7/14/1954 16:00	7/15/1954 8:30	16:30:00	LPRSA0189634	PAP-00456535	
7/22/1954 15:30	7/23/1954 8:30	17:00:00	LPRSA0189633	PAP-00456534	
8/3/1954 8:45	8/4/1954 8:45	24:00:00	LPRSA0189620	PAP-00456521	
8/9/1954 8:30	8/9/1954 13:30	5:00:00	LPRSA0189622	PAP-00456523	
8/19/1954 22:30	8/20/1954 9:00	10:30:00	LPRSA0189611	PAP-00456512	
8/20/1954 16:00	8/22/1954 8:00	40:00:00	LPRSA0189610	PAP-00456511	

**Exhibit 1a. Documented PVSC Bypasses at Union Outlet
(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)**

8/25/1954 16:15	8/26/1954 8:45	16:30:00	LPRSA0189609	PAP-00456510	
8/30/1954 16:15	8/31/1954 4:30	12:15:00	LPRSA0189608	PAP-00456509	
8/31/1954 3:30	9/1/1954 8:00	28:30:00	LPRSA0189608	PAP-00456509	
9/8/1954 14:00	9/9/1954 8:00	18:00:00	LPRSA0189607	PAP-00456508	
9/10/1954 16:00	9/12/1954 13:30	45:30:00	LPRSA0189606	PAP-00456507	
9/14/1954 16:15	9/18/1954 8:00	87:45:00	LPRSA0189605	PAP-00456506	
10/4/1954 8:30	10/8/1954 16:00	103:30:00	LPRSA0189604	PAP-00456505	
10/15/1954 14:10	10/15/1954 23:00	8:50:00	LPRSA0189603	PAP-00456504	
10/27/1954 16:00	10/28/1954 9:00	17:00:00	LPRSA0189602	PAP-00456503	
10/29/1954 9:00	11/1/1954 8:00	71:00:00	LPRSA0189601	PAP-00456502	
11/2/1954 12:30	11/2/1954 17:30	5:00:00	LPRSA0189600	PAP-00456501	
11/15/1954 9:15	11/15/1954 15:00	5:45:00	LPRSA0189597	PAP-00456498	
11/17/1954 16:00	11/18/1954 10:00	18:00:00	LPRSA0189597	PAP-00456498	
11/18/1954 15:10	11/20/1954 6:00	38:50:00	LPRSA0189597	PAP-00456498	
11/25/1954 9:50	11/29/1954 9:15	95:25:00	LPRSA0189597	PAP-00456498	
11/29/1954 15:30	11/30/1954 12:30	21:00:00	LPRSA0189597	PAP-00456498	
12/9/1954 13:30	12/9/1954 17:30	4:00:00	LPRSA0189596	PAP-00456497	
12/14/1954 9:00	12/14/1954 15:30	6:30:00	LPRSA0189595	PAP-00456496	
12/16/1954 13:45	12/16/1954 19:45	6:00:00	LPRSA0189594	PAP-00456495	
12/18/1954 10:00	12/19/1954 8:00	22:00:00	LPRSA0189593	PAP-00456494	
12/29/1954 12:30	12/30/1954 15:15	26:45:00	LPRSA0189585	PAP-00456486	
1/6/1955 13:30	1/6/1955 15:30	2:00:00	LPRSA0189582	PAP-00456485	
1/28/1955 15:30	1/31/1955 13:00	69:30:00	LPRSA0189580	PAP-00456483	
2/1/1955 14:45	2/2/1955 10:30	19:45:00	LPRSA0189580	PAP-00456483	
2/4/1955 23:50	2/7/1955 0:55	49:05:00	LPRSA0189580	PAP-00456483	
2/7/1955 14:30	2/8/1955 9:00	18:30:00	LPRSA0189580	PAP-00456483	
2/8/1955 12:15	2/12/1955 12:00	95:45:00	LPRSA0189580	PAP-00456483	
2/15/1955 14:45	2/15/1955 17:45	3:00:00	LPRSA0189580	PAP-00456483	
2/16/1955 15:30	2/16/1955 18:30	3:00:00	LPRSA0189580	PAP-00456483	
2/17/1955 10:45	2/18/1955 9:00	22:15:00	LPRSA0189580	PAP-00456483	
2/18/1955 16:00	2/19/1955 8:45	16:45:00	LPRSA0189579	PAP-00456482	
2/21/1955 14:30	2/23/1955 13:00	46:30:00	LPRSA0189579	PAP-00456482	
2/23/1955 15:45	2/24/1955 9:45	18:00:00	LPRSA0189579	PAP-00456482	
2/24/1955 15:30	2/25/1955 9:00	17:30:00	LPRSA0189579	PAP-00456482	
2/25/1955 15:15	2/26/1955 8:45	17:30:00	LPRSA0189579	PAP-00456482	
2/28/1955 13:15	3/2/1955 9:00	43:45:00	LPRSA0189579	PAP-00456482	
3/2/1955 14:00	3/3/1955 13:00	23:00:00	LPRSA0189579	PAP-00456482	
3/3/1955 16:00	3/4/1955 10:15	18:15:00	LPRSA0189579	PAP-00456482	
3/4/1955 12:30	3/6/1955 17:15	52:45:00	LPRSA0189579	PAP-00456482	
3/7/1955 13:00	3/7/1955 15:45	2:45:00	LPRSA0189578	PAP-00456481	
3/21/1955 14:30	3/22/1955 15:00	24:30:00	LPRSA0189577	PAP-00456480	
3/28/1955 13:00	3/29/1955 10:00	21:00:00	LPRSA0189576	PAP-00456479	
4/6/1955 11:00	4/7/1955 9:00	22:00:00	LPRSA0189575	PAP-00456478	
4/12/1955 14:00	4/13/1955 12:45	22:45:00	LPRSA0189574	PAP-00456477	
4/26/1955 12:45	4/27/1955 8:45	20:00:00	LPRSA0189573	PAP-00456476	

**Exhibit 1a. Documented PVSC Bypasses at Union Outlet
(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)**

5/31/1955 12:45	6/1/1955 7:45	19:00:00	LPRSA0189572	PAP-00456475	
6/21/1955 22:45	6/22/1955 8:00	9:15:00	LPRSA0189571	PAP-00456474	
8/7/1955 23:00	8/8/1955 2:15	3:15:00	LPRSA0189570	PAP-00456473	
8/11/1955 19:00	8/12/1955 15:15	20:15:00	LPRSA0189569	PAP-00456472	
8/13/1955 8:00	8/13/1955 12:30	4:30:00	LPRSA0189569	PAP-00456472	
8/15/1955 16:30	8/16/1955 8:30	16:00:00	LPRSA0189568	PAP-00456471	
8/18/1955 15:30	8/19/1955 2:30	11:00:00	LPRSA0189567	PAP-00456470	
8/19/1955 14:15	8/20/1955 8:50	18:35:00	LPRSA0189567	PAP-00456470	
8/21/1955 21:30	8/22/1955 8:45	11:15:00	LPRSA0189566	PAP-00456469	
8/24/1955 14:45	8/25/1955 8:45	18:00:00	LPRSA0189565	PAP-00456468	
8/25/1955 15:45	8/26/1955 8:45	17:00:00	LPRSA0189564	PAP-00456467	
9/24/1955 5:00	9/26/1955 8:00	51:00:00	LPRSA0189563	PAP-00456466	
10/6/1955 8:00	10/6/1955 12:30	4:30:00	LPRSA0189562	PAP-00456465	
10/6/1955 18:00	10/7/1955 9:45	15:45:00	LPRSA0189562	PAP-00456465	
10/7/1955 15:45	10/10/1955 7:30	63:45:00	LPRSA0189562	PAP-00456465	
10/14/1955 12:45	10/16/1955 20:40	55:55:00	LPRSA0189561	PAP-00456464	
10/17/1955 14:30	10/19/1955 9:30	43:00:00	LPRSA0189561	PAP-00456464	
10/19/1955 15:03	10/20/1955 16:00	24:57:00	LPRSA0189561	PAP-00456464	
10/30/1955 9:30	10/30/1955 13:30	4:00:00	LPRSA0189560	PAP-00456463	
11/10/1955 15:30	11/11/1955 3:30	12:00:00	LPRSA0189559	PAP-00456462	
11/11/1955 11:15	11/12/1955 8:15	21:00:00	LPRSA0189559	PAP-00456462	
11/16/1955 9:00	11/16/1955 14:00	5:00:00	LPRSA0189558	PAP-00456461	
11/17/1955 10:30	11/18/1955 9:30	23:00:00	LPRSA0189558	PAP-00456461	
1/30/1956 12:45	1/31/1956 7:30	18:45:00	LPRSA0189556	PAP-00456460	
2/2/1956 11:30	2/3/1956 7:30	20:00:00	LPRSA0189555	PAP-00456459	
2/6/1956 15:30	2/7/1956 8:15	16:45:00	LPRSA0189554	PAP-00456458	
2/18/1956 8:15	2/18/1956 15:15	7:00:00	LPRSA0189553	PAP-00456457	
3/8/1956 1:30	3/9/1956 8:15	30:45:00	LPRSA0189552	PAP-00456456	
3/14/1956 9:00	3/15/1956 8:30	23:30:00	LPRSA0189551	PAP-00456455	
3/16/1956 15:00	3/17/1956 9:30	18:30:00	LPRSA0189550	PAP-00456454	
3/21/1956 14:45	3/22/1956 9:45	19:00:00	LPRSA0189549	PAP-00456453	
3/23/1956 15:30	3/25/1956 9:00	41:30:00	LPRSA0189548	PAP-00456452	
3/29/1956 16:05	3/30/1956 8:50	16:45:00	LPRSA0189547	PAP-00456451	
4/7/1956 2:15	4/7/1956 9:15	7:00:00	LPRSA0189546	PAP-00456450	
4/8/1956 12:45	4/9/1956 9:00	20:15:00	LPRSA0189546	PAP-00456450	
4/11/1956 15:30	4/12/1956 8:05	16:35:00	LPRSA0189545	PAP-00456449	
5/2/1956 21:05	5/3/1956 8:45	11:40:00	LPRSA0189544	PAP-00456448	
6/2/1956 14:30	6/3/1956 11:40	21:10:00	LPRSA0189543	PAP-00456447	
6/27/1956 15:20	6/27/1956 18:00	2:40:00	LPRSA0189542	PAP-00456446	
7/16/1956 14:15	7/17/1956 8:45	18:30:00	LPRSA0189541	PAP-00456445	
7/21/1956 9:10	7/21/1956 14:45	5:35:00	LPRSA0189540	PAP-00456444	
7/27/1956 9:30	7/27/1956 15:00	5:30:00	LPRSA0189539	PAP-00456443	
8/6/1956 16:15	8/7/1956 8:00	15:45:00	LPRSA0189538	PAP-00456442	
8/21/1956 4:00	8/21/1956 15:45	11:45:00	LPRSA0189537	PAP-00456441	
9/6/1956 18:00	9/6/1956 22:20	4:20:00	LPRSA0189536	PAP-00456440	

Exhibit 1a. Documented PVSC Bypasses at Union Outlet
(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

9/7/1956 9:30	9/7/1956 16:15	6:45:00	LPRSA0189535	PAP-00456439	
10/22/1956 21:30	10/23/1956 10:45	13:15:00	LPRSA0189533	PAP-00456437	
10/23/1956 12:00	10/23/1956 14:15	2:15:00	LPRSA0189533	PAP-00456437	
10/31/1956 11:30	10/31/1956 19:15	7:45:00	LPRSA0189532	PAP-00456436	
11/1/1956 10:00	11/4/1956 11:00	73:00:00	LPRSA0189532	PAP-00456436	
11/18/1956 2:00	11/18/1956 10:45	8:45:00	LPRSA0189531	PAP-00456435	
11/22/1956 0:15	11/22/1956 7:45	7:30:00	LPRSA0189530	PAP-00456434	
12/9/1956 14:45	12/10/1956 8:15	17:30:00	LPRSA0189529	PAP-00456433	
12/14/1956 8:00	12/14/1956 15:45	7:45:00	LPRSA0189528	PAP-00456432	
12/22/1956 22:00	12/23/1956 9:45	11:45:00	LPRSA0189527	PAP-00456431	
1/23/1957 3:30	1/23/1957 11:45	8:15:00	LPRSA0189498	PAP-00456403	
2/9/1957 13:45	2/10/1957 8:30	18:45:00	LPRSA0189497	PAP-00456402	
2/26/1957 15:30	2/26/1957 22:15	6:45:00	LPRSA0189496	PAP-00456401	
3/1/1957 15:00	3/2/1957 10:15	19:15:00	LPRSA0189524	PAP-00456429	
3/8/1957 9:15	3/10/1957 9:45	48:30:00	LPRSA0189523	PAP-00456428	
3/15/1957 20:15	3/16/1957 0:15	4:00:00	LPRSA0189522	PAP-00456427	
3/19/1957 21:15	3/20/1957 14:00	16:45:00	LPRSA0189521	PAP-00456426	
4/2/1957 7:30	4/2/1957 13:30	6:00:00	LPRSA0189520	PAP-00456425	
4/4/1957 20:55	4/5/1957 10:30	13:35:00	LPRSA0189519	PAP-00456424	
4/5/1957 14:00	4/6/1957 13:00	23:00:00	LPRSA0189518	PAP-00456423	
4/8/1957 15:50	4/9/1957 8:15	16:25:00	LPRSA0189517	PAP-00456422	
4/9/1957 8:45	4/10/1957 15:30	30:45:00	LPRSA0189516	PAP-00456421	
4/10/1957 8:45	4/10/1957 15:30	6:45:00	LPRSA0189515	PAP-00456420	
4/11/1957 8:00	4/11/1957 15:30	7:30:00	LPRSA0189514	PAP-00456419	
4/12/1957 8:00	4/12/1957 15:45	7:45:00	LPRSA0189513	PAP-00456418	
4/18/1957 21:45	4/19/1957 13:15	15:30:00	LPRSA0189512	PAP-00456417	
4/23/1957 6:40	4/23/1957 13:45	7:05:00	LPRSA0189511	PAP-00456416	
4/25/1957 15:45	4/26/1957 9:15	17:30:00	LPRSA0189510	PAP-00456415	
4/29/1957 13:00	4/29/1957 15:30	2:30:00	LPRSA0189509	PAP-00456414	
5/14/1957 20:45	5/15/1957 0:30	3:45:00	LPRSA0189508	PAP-00456413	
5/16/1957 0:00	8/25/1957 23:59	0:00:00			data missing
8/26/1957 0:45	8/26/1957 9:00	8:15:00	LPRSA0189507	PAP-00456412	
9/10/1957 22:30	9/11/1957 8:30	10:00:00	LPRSA0189506	PAP-00456411	
9/16/1957 23:30	9/17/1957 9:00	9:30:00	LPRSA0189505	PAP-00456410	
9/18/1957 0:00	12/19/1957 23:59	0:00:00			data missing
12/20/1957 14:45	12/21/1957 10:05	19:20:00	LPRSA0189501	PAP-00456406	
12/26/1957 11:00	12/26/1957 16:00	5:00:00	LPRSA0189500	PAP-00456405	
12/26/1957 16:40	12/26/1957 18:30	1:50:00	LPRSA0189500	PAP-00456405	
1/14/1958 14:00	1/15/1958 8:30	18:30:00	LPRSA0189494	PAP-00456195	Year not provided on throw out log. Assumption made in Koch report was used. Day and time correct
1/21/1958 21:15	1/22/1958 11:45	14:30:00	LPRSA0189492	PAP-00456193-94	
1/22/1958 16:00	1/22/1958 22:15	6:15:00	LPRSA0189491	PAP-00456192	
1/24/1958 16:30	1/26/1958 10:35	42:05:00	LPRSA0189490	PAP-00456191	
2/7/1958 14:30	2/8/1958 8:20	17:50:00	LPRSA0189489	PAP-00456190	

Exhibit 1a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

2/27/1958 11:00	2/28/1958 15:45	28:45:00	LPRSA0189488	PAP-00456189	
3/3/1958 21:15	3/4/1958 8:15	11:00:00	LPRSA0189487	PAP-00456188	
3/14/1958 14:30	3/15/1958 15:00	24:30:00	LPRSA0189486	PAP-00456187	
3/20/1958 1:45	3/22/1958 9:00	55:15:00	LPRSA0189485	PAP-00456186	
3/31/1958 15:15	3/31/1958 22:35	7:20:00	LPRSA0189484	PAP-00456185	
4/6/1958 13:00	4/7/1958 21:00	32:00:00	LPRSA0189483	PAP-00456184	
4/11/1958 8:00	4/12/1958 10:30	26:30:00	LPRSA0189482	PAP-00456183	
4/23/1958 1:25	4/23/1958 4:40	3:15:00	LPRSA0189481	PAP-00456182	
4/28/1958 8:30	4/28/1958 15:45	7:15:00	LPRSA0189480	PAP-00456181	
4/29/1958 18:30	4/30/1958 8:00	13:30:00	LPRSA0189479	PAP-00456180	
5/6/1958 18:45	5/7/1958 4:35	9:50:00	LPRSA0189478	PAP-00456179	
5/7/1958 11:15	5/7/1958 18:00	6:45:00	LPRSA0189478	PAP-00456179	
5/15/1958 15:45	5/15/1958 17:10	1:25:00	LPRSA0189477	PAP-00456178	
5/25/1958 12:25	5/26/1958 17:25	29:00:00	LPRSA0189476	PAP-00456177	
6/9/1958 7:10	6/9/1958 8:00	0:50:00	LPRSA0189475	PAP-00456176	
6/26/1958 16:00	6/27/1958 5:45	13:45:00	LPRSA0189474	PAP-00456175	
7/31/1958 18:50	8/1/1958 8:15	13:25:00	LPRSA0189473	PAP-00456174	
8/25/1958 13:30	8/26/1958 8:00	18:30:00	LPRSA0189472	PAP-00456173	
9/18/1958 1:45	9/18/1958 8:30	6:45:00	LPRSA0189471	PAP-00456172	
10/1/1958 10:30	10/1/1958 17:15	6:45:00	LPRSA0189470	PAP-00456171	Moved from Yantacaw.
10/22/1958 18:00	10/23/1958 18:10	24:10:00	LPRSA0189469	PAP-00456170	
10/25/1958 15:25	10/27/1958 6:00	38:35:00	LPRSA0189468	PAP-00456169	
10/27/1958 16:00	10/28/1958 2:25	10:25:00	LPRSA0189467	PAP-00456168	
11/28/1958 18:45	11/29/1958 9:40	14:55:00	LPRSA0189466	PAP-00456167	
12/29/1958 19:50	12/30/1958 4:15	8:25:00	LPRSA0189465	PAP-00456166	
1/20/1959 16:00	1/21/1959 8:00	16:00:00	LPRSA0189463	PAP-00456232	
1/21/1959 15:15	1/22/1959 4:35	13:20:00	LPRSA0189462	PAP-00456231	
2/10/1959 11:45	2/10/1959 23:55	12:10:00	LPRSA0189461	PAP-00456230	
3/6/1959 6:45	3/7/1959 9:15	26:30:00	LPRSA0189458	PAP-00456227	
3/12/1959 16:25	3/13/1959 7:00	14:35:00	LPRSA0189459	PAP-00456228	
3/30/1959 16:00	3/31/1959 9:00	17:00:00	LPRSA0189460	PAP-00456229	
4/2/1959 13:50	4/3/1959 8:00	18:10:00	LPRSA0189457	PAP-00456226	
4/27/1959 15:15	4/28/1959 8:30	17:15:00	LPRSA0189456	PAP-00456225	
4/28/1959 23:15	4/29/1959 8:25	9:10:00	LPRSA0189455	PAP-00456224	
5/13/1959 17:15	5/13/1959 20:45	3:30:00	LPRSA0189438	PAP-00456207	
5/22/1959 16:45	5/22/1959 20:00	3:15:00	LPRSA0189439	PAP-00456208	Entry missed in Koch report
6/2/1959 15:25	6/3/1959 7:30	16:05:00	LPRSA0189454	PAP-00456223	
6/25/1959 10:15	6/25/1959 12:30	2:15:00	LPRSA0189453	PAP-00456222	
7/20/1959 16:15	7/20/1959 17:15	1:00:00	LPRSA0189452	PAP-00456221	
7/20/1959 19:45	7/20/1959 23:20	3:35:00	LPRSA0189452	PAP-00456221	
7/23/1959 16:00	7/23/1959 18:35	2:35:00	LPRSA0189451	PAP-00456220	
7/23/1959 20:15	7/23/1959 23:05	2:50:00	LPRSA0189451	PAP-00456220	
7/24/1959 15:30	7/24/1959 17:45	2:15:00	LPRSA0189450	PAP-00456219	
8/5/1959 10:05	8/6/1959 8:00	21:55:00	LPRSA0189448	PAP-00456217	
8/9/1959 4:45	8/9/1959 12:00	7:15:00	LPRSA0189447	PAP-00456216	

**Exhibit 1a. Documented PVSC Bypasses at Union Outlet
(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)**

8/31/1959 13:15	9/1/1959 8:45	19:30:00	LPRSA0189445	PAP-00456214	
9/1/1959 16:00	9/1/1959 23:40	7:40:00	LPRSA0189445	PAP-00456214	
9/3/1959 14:15	9/3/1959 23:10	8:55:00	LPRSA0189444	PAP-00456213	
10/1/1959 12:45	10/1/1959 15:30	2:45:00	LPRSA0189443	PAP-00456212	
10/7/1959 17:15	10/8/1959 8:15	15:00:00	LPRSA0189442	PAP-00456211	Moved from Herbert.
10/9/1959 4:30	10/9/1959 9:15	4:45:00	LPRSA0189441	PAP-00456210	Moved from Herbert.
10/9/1959 11:00	10/10/1959 13:45	26:45:00	LPRSA0189440	PAP-00456209	
10/22/1959 13:45	10/22/1959 18:05	4:20:00	LPRSA0189436	PAP-00456205	
10/24/1959 10:15	10/25/1959 10:30	24:15:00	LPRSA0189435	PAP-00456204	
11/6/1959 18:00	11/7/1959 17:00	23:00:00	LPRSA0189434	PAP-00456203	
11/24/1959 16:15	11/25/1959 8:25	16:10:00	LPRSA0189432	PAP-00456201	Moved from Verona.
12/6/1959 23:40	12/8/1959 8:45	33:05:00	LPRSA0189431	PAP-00456200	
12/12/1959 18:45	12/13/1959 9:00	14:15:00	LPRSA0189430	PAP-00456199	
12/28/1959 21:20	12/29/1959 13:15	15:55:00	LPRSA0189429	PAP-00456198	
12/29/1959 16:35	12/30/1959 8:15	15:40:00	LPRSA0189428	PAP-00456197	
1/3/1960 9:30	1/4/1960 8:10	22:40:00	LPRSA0189427	PAP-00456270	
1/13/1960 11:15	1/14/1960 8:25	21:10:00	LPRSA0189426	PAP-00456269	
1/15/1960 0:45	1/16/1960 13:10	36:25:00	LPRSA0189425	PAP-00456268	
1/18/1960 22:30	1/19/1960 8:10	9:40:00	LPRSA0189424	PAP-00456267	
2/6/1960 6:00	2/6/1960 12:30	6:30:00	LPRSA0189423	PAP-00456266	
2/11/1960 5:30	2/11/1960 17:50	12:20:00	LPRSA0189422	PAP-00456265	
2/18/1960 20:30	2/19/1960 21:50	25:20:00	LPRSA0189421	PAP-00456264	
2/25/1960 22:30	2/26/1960 15:10	16:40:00	LPRSA0189420	PAP-00456263	
3/3/1960 17:50	3/4/1960 9:30	15:40:00	LPRSA0189419	PAP-00456262	
3/17/1960 13:40	3/17/1960 23:20	9:40:00	LPRSA0189418	PAP-00456261	
3/31/1960 14:55	4/1/1960 8:10	17:15:00	LPRSA0189417	PAP-00456260	
4/3/1960 21:20	4/4/1960 10:55	13:35:00	LPRSA0189416	PAP-00456259	
4/4/1960 22:20	4/6/1960 9:40	35:20:00	LPRSA0189415	PAP-00456258	
4/7/1960 11:30	4/8/1960 16:25	28:55:00	LPRSA0189414	PAP-00456257	
4/11/1960 23:20	4/12/1960 8:02	8:42:00	LPRSA0189413	PAP-00456256	
4/18/1960 10:14	4/18/1960 17:30	7:16:00	LPRSA0189412	PAP-00456255	
4/26/1960 21:00	4/27/1960 12:00	15:00:00	LPRSA0189411	PAP-00456254	
5/9/1960 8:00	5/9/1960 17:55	9:55:00	LPRSA0189410	PAP-00456253	
5/12/1960 19:30	5/13/1960 17:30	22:00:00	LPRSA0189409	PAP-00456252	
5/23/1960 12:40	5/24/1960 8:45	20:05:00	LPRSA0189408	PAP-00456250	
6/3/1960 17:45	6/4/1960 20:00	26:15:00	LPRSA0189407	PAP-00456250	
7/1/1960 18:10	7/1/1960 21:20	3:10:00	LPRSA0189406	PAP-00456249	
7/12/1960 20:50	7/13/1960 8:20	11:30:00	LPRSA0189405	PAP-00456248	
7/14/1960 12:50	7/14/1960 21:20	8:30:00	LPRSA0189404	PAP-00456247	
7/27/1960 13:20	7/28/1960 8:20	19:00:00	LPRSA0189403	PAP-00456246	
7/30/1960 9:00	7/31/1960 8:15	23:15:00	LPRSA0189402	PAP-00456245	
8/10/1960 8:20	8/10/1960 12:22	4:02:00	LPRSA0189401	PAP-00456244	
8/10/1960 21:30	8/11/1960 8:10	10:40:00	LPRSA0189400	PAP-00456243	
8/19/1960 7:20	8/20/1960 9:00	25:40:00	LPRSA0189399	PAP-00456242	
8/30/1960 18:25	8/30/1960 20:15	1:50:00	LPRSA0189398	PAP-00456241	

**Exhibit 1a. Documented PVSC Bypasses at Union Outlet
(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)**

8/31/1960 19:15	9/1/1960 8:15	13:00:00	LPRSA0189398	PAP-00456241	
9/11/1960 23:00	9/13/1960 8:15	33:15:00	LPRSA0189397	PAP-00456240	
9/19/1960 10:25	9/19/1960 16:30	6:05:00	LPRSA0189396	PAP-00456239	
10/20/1960 6:45	10/20/1960 18:05	11:20:00	LPRSA0189395	PAP-00456238	
11/10/1960 7:15	11/10/1960 18:15	11:00:00	LPRSA0189394	PAP-00456237	
11/29/1960 15:55	11/29/1960 23:30	7:35:00	LPRSA0189393	PAP-00456236	
12/12/1960 11:20	12/13/1960 10:15	22:55:00	LPRSA0189392	PAP-00456235	
12/21/1960 7:35	12/21/1960 21:35	14:00:00	LPRSA0189391	PAP-00456234	
1/1/1961 9:00	1/2/1961 8:10	23:10:00	LPRSA0189389	PAP-00456730	
2/20/1961 15:40	2/20/1961 21:50	6:10:00	LPRSA0189388	PAP-00456729	
2/22/1961 23:30	2/24/1961 8:30	33:00:00	LPRSA0189387	PAP-00456728	
2/24/1961 15:15	2/27/1961 8:15	65:00:00	LPRSA0189386	PAP-00456727	
2/28/1961 15:30	2/28/1961 22:30	7:00:00	LPRSA0189385	PAP-00456726	
3/1/1961 16:00	3/2/1961 8:05	16:05:00	LPRSA0189378	PAP-00456719	
3/6/1961 12:00	3/7/1961 8:10	20:10:00	LPRSA0189379	PAP-00456720	
3/8/1961 12:15	3/9/1961 8:25	20:10:00	LPRSA0189380	PAP-00456721	
3/9/1961 12:30	3/10/1961 11:55	23:25:00	LPRSA0189381	PAP-00456722	
3/13/1961 22:30	3/15/1961 8:15	33:45:00	LPRSA0189382	PAP-00456723	
3/23/1961 11:00	3/24/1961 12:30	25:30:00	LPRSA0189383	PAP-00456724	
3/28/1961 23:20	3/29/1961 8:10	8:50:00	LPRSA0189384	PAP-00456725	
4/1/1961 12:05	4/2/1961 9:15	21:10:00	LPRSA0189377	PAP-00456718	
4/10/1961 8:15	4/10/1961 15:30	7:15:00	LPRSA0189376	PAP-00456717	
4/12/1961 22:15	4/13/1961 23:05	24:50:00	LPRSA0189375	PAP-00456716	
4/14/1961 15:00	4/14/1961 16:00	1:00:00	LPRSA0189374	PAP-00456715	
4/16/1961 11:20	4/17/1961 8:00	20:40:00	LPRSA0189373	PAP-00456714	
4/17/1961 15:05	4/17/1961 22:50	7:45:00	LPRSA0189372	PAP-00456713	
4/18/1961 8:05	4/18/1961 23:05	15:00:00	LPRSA0189371	PAP-00456712	
4/24/1961 8:30	4/25/1961 8:10	23:40:00	LPRSA0189370	PAP-00456711	
4/25/1961 16:55	4/28/1961 8:30	63:35:00	LPRSA0189368	PAP-00456709	
4/28/1961 20:10	4/29/1961 10:30	14:20:00	LPRSA0189367	PAP-00456708	
5/16/1961 13:15	5/16/1961 21:55	8:40:00	LPRSA0189365	PAP-00456706	
5/26/1961 15:15	5/26/1961 21:20	6:05:00	LPRSA0189364	PAP-00456705	
6/14/1961 15:35	6/14/1961 19:40	4:05:00	LPRSA0189362	PAP-00456703	
6/14/1961 23:40	6/15/1961 8:20	8:40:00	LPRSA0189361	PAP-00456702	
6/20/1961 20:55	6/21/1961 23:30	26:35:00	LPRSA0189360	PAP-00456701	
7/15/1961 19:45	7/17/1961 8:20	36:35:00	LPRSA0189358	PAP-00456699	
7/20/1961 7:30	7/20/1961 15:45	8:15:00	LPRSA0189357	PAP-00456698	
7/24/1961 15:45	7/25/1961 8:20	16:35:00	LPRSA0189356	PAP-00456697	
7/31/1961 19:00	8/1/1961 8:45	13:45:00	LPRSA0189355	PAP-00456696	
8/3/1961 10:50	8/3/1961 15:35	4:45:00	LPRSA0189354	PAP-00456695	
8/21/1961 14:10	8/22/1961 8:00	17:50:00	LPRSA0189353	PAP-00456694	
8/23/1961 10:20	8/24/1961 8:20	22:00:00	LPRSA0189352	PAP-00456693	
8/24/1961 13:10	8/24/1961 15:35	2:25:00	LPRSA0189351	PAP-00456690	
9/15/1961 9:30	9/15/1961 20:45	11:15:00	LPRSA0189349	PAP-00456690	

Exhibit 1a. Documented PVSC Bypasses at Union Outlet

(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

9/19/1961 20:00	9/21/1961 18:30	46:30:00	LPRSA0189348	PAP-00456689	
10/3/1961 6:50	10/4/1961 11:15	28:25:00	LPRSA0189347	PAP-00456688	
10/4/1961 21:15	10/6/1961 12:05	38:50:00	LPRSA0189346	PAP-00456687	
10/30/1961 17:20	10/30/1961 23:25	6:05:00	LPRSA0189344	PAP-00456685	
11/14/1961 12:55	11/14/1961 23:15	10:20:00	LPRSA0189343	PAP-00456684	
11/16/1961 19:10	11/17/1961 8:20	13:10:00	LPRSA0189342	PAP-00456683	
11/24/1961 9:00	11/25/1961 8:30	23:30:00	LPRSA0189341	PAP-00456682	
12/12/1961 9:20	12/13/1961 9:25	24:05:00	LPRSA0189339	PAP-00456680	
12/18/1961 8:30	12/18/1961 23:15	14:45:00	LPRSA0189338	PAP-00456679	
12/28/1961 9:55	12/28/1961 23:00	13:05:00	LPRSA0189337	PAP-00456678	
1/6/1962 11:20	1/7/1962 9:40	22:20:00	LPRSA0189336	PAP-00456328	
1/15/1962 15:15	1/15/1962 21:00	5:45:00	LPRSA0189335	PAP-00456327	
2/5/1962 18:20	2/6/1962 8:25	14:05:00	LPRSA0189333	PAP-00456325	
2/14/1962 12:30	2/14/1962 20:55	8:25:00	LPRSA0189332	PAP-00456324	
2/19/1962 14:10	2/20/1962 7:00	16:50:00	LPRSA0189331	PAP-00456323	
2/24/1962 5:40	2/25/1962 11:10	29:30:00	LPRSA0189330	PAP-00456322	
2/26/1962 10:45	3/1/1962 8:00	69:15:00	LPRSA0189329	PAP-00456321	
3/6/1962 10:25	3/7/1962 8:15	21:50:00	LPRSA0189328	PAP-00456320	
3/12/1962 6:18	3/13/1962 22:45	40:27:00	LPRSA0189327	PAP-00456319	
3/21/1962 14:55	3/22/1962 8:15	17:20:00	LPRSA0189326	PAP-00456318	
4/1/1962 5:30	4/2/1962 9:00	27:30:00	LPRSA0189325	PAP-00456317	
4/7/1962 14:00	4/9/1962 8:15	42:15:00	LPRSA0189324	PAP-00456316	
4/9/1962 15:30	4/10/1962 8:10	16:40:00	LPRSA0189323	PAP-00456315	
4/11/1962 22:35	4/12/1962 7:05	8:30:00	LPRSA0189322	PAP-00456314	
4/12/1962 21:35	4/13/1962 23:30	25:55:00	LPRSA0189321	PAP-00456313	
4/27/1962 18:40	4/28/1962 3:00	8:20:00	LPRSA0189320	PAP-00456312	
4/30/1962 15:50	5/1/1962 8:00	16:10:00	LPRSA0189311	PAP-00456303	
5/3/1962 0:20	5/3/1962 7:10	6:50:00	LPRSA0189319	PAP-00456311	
5/8/1962 22:30	5/9/1962 8:10	9:40:00	LPRSA0189318	PAP-00456310	
5/24/1962 21:40	5/25/1962 8:20	10:40:00	LPRSA0189317	PAP-00456309	
5/31/1962 22:35	6/1/1962 7:03	8:28:00	LPRSA0189316	PAP-00456308	
6/5/1962 18:40	6/6/1962 8:15	13:35:00	LPRSA0189315	PAP-00456307	
6/12/1962 12:00	6/14/1962 15:30	51:30:00	LPRSA0189314	PAP-00456306	Entry missed in Koch report
6/19/1962 22:50	6/20/1962 8:10	9:20:00	LPRSA0189313	PAP-00456305	
6/26/1962 16:15	6/27/1962 8:15	16:00:00	LPRSA0189312	PAP-00456304	
7/18/1962 13:30	7/18/1962 16:55	3:25:00	LPRSA0189310	PAP-00456302	
7/23/1962 17:15	7/24/1962 8:20	15:05:00	LPRSA0189309	PAP-00456301	
8/7/1962 13:30	8/8/1962 8:15	18:45:00	LPRSA0189308	PAP-00456300	
8/9/1962 13:10	8/10/1962 8:55	19:45:00	LPRSA0189307	PAP-00456299	
8/10/1962 15:45	8/11/1962 12:45	21:00:00	LPRSA0189306	PAP-00456298	
8/17/1962 17:15	8/18/1962 9:20	16:05:00	LPRSA0189305	PAP-00456297	
8/21/1962 4:04	8/21/1962 14:40	10:36:00	LPRSA0189304	PAP-00456296	
8/28/1962 5:00	8/29/1962 15:15	34:15:00	LPRSA0189303	PAP-00456295	
8/29/1962 16:05	8/29/1962 21:30	5:25:00	LPRSA0189302	PAP-00456294	
9/5/1962 9:15	9/5/1962 23:00	13:45:00	LPRSA0189301	PAP-00456293	

Exhibit 1a. Documented PVSC Bypasses at Union Outlet
(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark,West Orange, Little Falls)

9/14/1962 16:15	9/14/1962 18:25	2:10:00	LPRSA0189300	PAP-00456292	
9/17/1962 16:00	9/18/1962 8:10	16:10:00	LPRSA0189299	PAP-00456291	
9/19/1962 18:00	9/20/1962 14:05	20:05:00	LPRSA0189298	PAP-00456290	
9/25/1962 23:15	9/26/1962 10:45	11:30:00	LPRSA0189297	PAP-00456289	
9/26/1962 23:00	9/28/1962 19:50	44:50:00	LPRSA0189296	PAP-00456288	
10/4/1962 22:25	10/7/1962 9:25	59:00:00	LPRSA0189295	PAP-00456287	
10/9/1962 9:40	10/10/1962 12:50	27:10:00	LPRSA0189294	PAP-00456286	
10/11/1962 23:10	10/12/1962 8:30	9:20:00	LPRSA0189293	PAP-00456285	
10/17/1962 8:08	10/17/1962 12:15	4:07:00	LPRSA0189292	PAP-00456284	
10/23/1962 10:55	10/24/1962 8:30	21:35:00	LPRSA0189291	PAP-00456283	
10/25/1962 20:15	10/26/1962 23:05	26:50:00	LPRSA0189290	PAP-00456282	
10/30/1962 12:30	11/2/1962 13:35	73:05:00	LPRSA0189289	PAP-00456281	
11/3/1962 9:55	11/5/1962 8:00	46:05:00	LPRSA0189288	PAP-00456280	
11/9/1962 16:25	11/11/1962 10:00	41:35:00	LPRSA0189287	PAP-00456279	
11/13/1962 15:00	11/14/1962 8:10	17:10:00	LPRSA0189286	PAP-00456278	
11/18/1962 22:15	11/19/1962 21:30	23:15:00	LPRSA0189285	PAP-00456277	
11/21/1962 20:15	11/23/1962 9:00	36:45:00	LPRSA0189284	PAP-00456276	
12/5/1962 8:15	12/8/1962 11:15	75:00:00	LPRSA0189283	PAP-00456275	
12/22/1962 11:30	12/24/1962 9:00	45:30:00	LPRSA0189282	PAP-00456274	
12/26/1962 13:30	12/27/1962 11:55	22:25:00	LPRSA0189281	PAP-00456273	
12/29/1962 15:30	12/30/1962 11:50	20:20:00	LPRSA0189280	PAP-00456272	
Subtotal 1950-1962 Koch Report		13691:59:00			
Subtotal 1950-1962 Throw out Logs		13749:54:00			

Koch report 1974-1975 (PAP-00488406)					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates Number (throw-out logs)	Comments
10/15/1974	10/16/1974	42:45:00	LPRSA0232953	PAP-00456761	
11/12/1974	11/13/1974	5:50:00	LPRSA0232953	PAP-00456761	
12/1/1974	12/2/1974	15:13:00	LPRSA0232953	PAP-00456761	
12/7/1974	12/8/1974	18:45:00	LPRSA0232953	PAP-00456761	
12/16/1974	12/16/1974	20:55:00	LPRSA0232953	PAP-00456761	
1/6/1975	1/7/1975	3:25:00	LPRSA0232953	PAP-00456761	
1/8/1975	1/9/1975	12:55:00	LPRSA0232953	PAP-00456761	
1/13/1975	1/13/1975	22:40:00	LPRSA0232953	PAP-00456761	
1/18/1975	1/18/1975	14:45:00	LPRSA0232953	PAP-00456761	
1/19/1975	1/20/1975	10:11:00	LPRSA0232953	PAP-00456761	
1/29/1975	1/29/1975	22:00:00	LPRSA0232953	PAP-00456761	
1/31/1975	2/2/1975	49:20:00	LPRSA0232953	PAP-00456761	
2/17/1975	2/18/1975	4:45:00	LPRSA0232953	PAP-00456761	
2/24/1975	2/24/1975	24:45:00	LPRSA0232953	PAP-00456761	
3/12/1975	3/12/1975	14:30:00	LPRSA0232953	PAP-00456761	
3/19/1975	3/20/1975	19:55:00	LPRSA0232953	PAP-00456761	
4/3/1975	4/3/1975	12:50:00	LPRSA0232953	PAP-00456761	

Exhibit 1a. Documented PVSC Bypasses at Union Outlet
(Montclair, Bloomfield, Orange, Belleville, Glen Ridge, East Orange, Newark, West Orange, Little Falls)

4/23/1975	4/24/1975	4:15:00	LPRSA0232954	PAP-00456762	
4/24/1975	4/25/1975	9:00:00	LPRSA0232954	PAP-00456762	
4/25/1975	4/26/1975	8:50:00	LPRSA0232954	PAP-00456762	
5/4/1975	5/5/1975	13:10:00	LPRSA0232954	PAP-00456762	
5/13/1975	5/13/1975	4:45:00	LPRSA0232954	PAP-00456762	
6/1/1975	6/1/1975	6:05:00	LPRSA0232954	PAP-00456762	
6/5/1975	6/6/1975	12:20:00	LPRSA0232954	PAP-00456762	
6/6/1975	6/6/1975	8:45:00	LPRSA0232954	PAP-00456762	
6/12/1975	6/13/1975	22:21:00	LPRSA0232954	PAP-00456762	
6/28/1975	6/28/1975	2:00:00	LPRSA0232954	PAP-00456762	
7/7/1975	7/7/1975	13:05:00	LPRSA0232954	PAP-00456762	
7/9/1975	7/9/1975	4:30:00	LPRSA0232954	PAP-00456762	
7/13/1975	7/13/1975	13:25:00	LPRSA0232954	PAP-00456762	
7/14/1975	7/14/1975	12:15:00	LPRSA0232954	PAP-00456762	
7/15/1975	7/15/1975	9:35:00	LPRSA0232954	PAP-00456762	
7/20/1975	7/21/1975	13:25:00	LPRSA0232954	PAP-00456762	
7/24/1975	7/25/1975	13:25:00	LPRSA0232954	PAP-00456762	
8/24/1975	8/25/1975	7:35:00	LPRSA0232954	PAP-00456762	
9/22/1975	9/27/1975	102:25:00	LPRSA0232955	PAP-00456763	
Subtotal 1974-1975 Koch Report		596:40:00			

Exhibit 1b. Documented PVSC Bypasses at Verona Avenue
(Newark)

Allocation Report			
	Time of bypasses	Time observed	% of Total Time
1950-1962	8484:45:00	106697:00:00	7.95%
1974-1975	0:00:00	0:00:00	0.00%
Total	8484:45:00	106697:00:00	7.95%

Koch report 1950-1962 (PAP-00488407 - PAP-00488412)					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates Number (throw-out logs)	Comments
10/4/1950 22:00	10/5/1950 11:30	13:30:00	LPRSA0188654	PAP-00456399	
10/10/1950 2:30	10/10/1950 8:30	6:00:00	LPRSA0188652	PAP-00456397	
10/12/1950 13:30	10/13/1950 9:30	20:00:00	LPRSA0188650	PAP-00456395	
10/23/1950 13:30	10/24/1950 9:00	19:30:00	LPRSA0188648	PAP-00456393	
11/20/1950 18:00	11/21/1950 9:00	15:00:00	LPRSA0188646	PAP-00456391	
11/25/1950 9:00	11/25/1950 13:00	4:00:00	LPRSA0188643	PAP-00456388	
12/4/1950 12:30	12/4/1950 21:00	8:30:00	LPRSA0188641	PAP-00456386	
12/7/1950 16:00	12/8/1950 11:30	19:30:00	LPRSA0188637	PAP-00456382	
12/15/1950 22:30	12/16/1950 9:00	10:30:00	LPRSA0188639	PAP-00456384	
12/29/1950 12:30	12/30/1950 11:30	23:00:00	LPRSA0188635	PAP-00456380	
1/7/1951 17:00	1/8/1951 9:00	16:00:00	LPRSA0188633	PAP-00456378	
1/11/1951 17:30	1/12/1951 8:30	15:00:00	LPRSA0188619	PAP-00456364	
1/14/1951 18:00	1/15/1951 12:00	18:00:00	LPRSA0188631	PAP-00456376	
1/23/1951 2:00	1/24/1951 14:00	36:00:00	LPRSA0188621	PAP-00456366	
1/25/1951 16:00	1/25/1951 19:00	3:00:00	LPRSA0188623	PAP-00456368	
1/28/1951 17:00	1/29/1951 8:30	15:30:00	LPRSA0188625	PAP-00456370	
1/29/1951 19:30	1/30/1951 10:00	14:30:00	LPRSA0188625	PAP-00456370	
1/31/1951 16:00	2/1/1951 15:00	23:00:00	LPRSA0188628	PAP-00456373	
2/7/1951 11:00	2/7/1951 19:30	8:30:00	LPRSA0188585	PAP-00456085; PAP-00456330	
2/10/1951 5:30	2/10/1951 12:00	6:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/11/1951 18:00	2/13/1951 9:30	39:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/13/1951 19:45	2/14/1951 10:00	14:15:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/14/1951 17:45	2/15/1951 9:30	15:45:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/17/1951 4:00	2/17/1951 22:00	18:00:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/19/1951 17:00	2/20/1951 9:30	16:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
2/20/1951 16:00	2/21/1951 17:30	25:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	

Exhibit 1b. Documented PVSC Bypasses at Verona Avenue
(Newark)

2/22/1951 10:30	2/22/1951 11:45	1:15:00	LPRSA0188596	PAP-00456064; PAP-00456341	
2/23/1951 8:30	2/23/1951 10:00	1:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
3/1/1951 14:30	3/2/1951 10:00	19:30:00	LPRSA0188604	PAP-00456349	
3/3/1951 15:00	3/5/1951 10:30	43:30:00	LPRSA0188606	PAP-00456351	
3/13/1951 16:30	3/15/1951 9:30	41:00:00	LPRSA0188609	PAP-00456354	
3/16/1951 16:00	3/19/1951 9:30	65:30:00	LPRSA0188612	PAP-00456357	
3/19/1951 17:00	3/20/1951 12:00	19:00:00	LPRSA0188616	PAP-00456361	
3/22/1951 0:00	12/31/1951 23:59				data missing
2/17/1952 3:30	2/18/1952 9:00	29:30:00	LPRSA0189755	PAP-00456150	
2/20/1952 18:00	2/21/1952 9:00	15:00:00	LPRSA0189754	PAP-00456149	
2/29/1952 21:00	3/1/1952 9:30	12:30:00	LPRSA0189753	PAP-00456148	
3/3/1952 17:30	3/5/1952 14:30	45:00:00	LPRSA0189753	PAP-00456148	
3/11/1952 5:00	3/17/1952 14:00	153:00:00	LPRSA0189752	PAP-00456147	
3/19/1952 10:30	3/19/1952 19:00	8:30:00	LPRSA0189751	PAP-00456146	
3/22/1952 17:00	3/24/1952 9:30	40:30:00	LPRSA0189750	PAP-00456145	
3/24/1952 18:15	3/25/1952 9:30	15:15:00	LPRSA0189750	PAP-00456145	
4/4/1952 16:45	4/6/1952 9:00	40:15:00	LPRSA0189749	PAP-00456144	
4/14/1952 1:15	4/14/1952 10:30	9:15:00	LPRSA0189748	PAP-00456143	
4/14/1952 14:30	4/15/1952 13:00	22:30:00	LPRSA0189748	PAP-00456143	
4/23/1952 16:30	4/24/1952 9:00	16:30:00	LPRSA0189747	PAP-00456142	
4/25/1952 9:00	4/25/1952 19:15	10:15:00	LPRSA0189744	PAP-00456139	
4/26/1952 10:30	4/28/1952 16:00	53:30:00	LPRSA0189744	PAP-00456139	
4/29/1952 15:45	5/3/1952 9:30	89:45:00	LPRSA0189745	PAP-00456140	
5/5/1952 9:30	5/5/1952 16:45	7:15:00	LPRSA0189745	PAP-00456140	
5/6/1952 15:15	5/6/1952 22:00	6:45:00	LPRSA0189745	PAP-00456140	
5/12/1952 14:00	5/12/1952 16:00	2:00:00	LPRSA0189743	PAP-00456138	Throw out log confusing. Defaulted to Koch report
5/13/1952 14:30	5/14/1952 8:30	18:00:00	LPRSA0189743	PAP-00456138	
5/18/1952 7:15	5/19/1952 9:30	26:15:00	LPRSA0189741	PAP-00456136	
5/19/1952 18:30	5/20/1952 14:45	20:15:00	LPRSA0189741	PAP-00456136	
5/21/1952 15:30	5/22/1952 9:30	18:00:00	LPRSA0189741	PAP-00456136	
5/22/1952 16:00	5/23/1952 13:45	21:45:00	LPRSA0189742	PAP-00456137	
5/25/1952 8:45	5/25/1952 13:45	5:00:00	LPRSA0189740	PAP-00456135	
5/26/1952 10:15	5/27/1952 8:30	22:15:00	LPRSA0189740	PAP-00456135	
6/2/1952 14:45	6/3/1952 9:30	18:45:00	LPRSA0189738	PAP-00456133	
6/9/1952 8:30	6/10/1952 17:00	32:30:00	LPRSA0189736	PAP-00456131	
6/11/1952 14:00	6/11/1952 17:00	3:00:00	LPRSA0189737	PAP-00456132	
6/17/1952 16:40	6/17/1952 20:50	4:10:00	LPRSA0189735	PAP-00456130	
6/19/1952 16:00	6/20/1952 10:30	18:30:00	LPRSA0189734	PAP-00456129	
6/27/1952 15:40	6/28/1952 8:10	16:30:00	LPRSA0189729	PAP-00456124	
6/29/1952 0:15	6/30/1952 9:15	33:00:00	LPRSA0189728	PAP-00456123	
7/8/1952 15:45	7/10/1952 9:15	41:30:00	LPRSA0189730	PAP-00456125	
7/21/1952 15:45	7/22/1952 9:45	18:00:00	LPRSA0189726	PAP-00456121	

**Exhibit 1b. Documented PVSC Bypasses at Verona Avenue
(Newark)**

7/31/1952 16:15	8/1/1952 9:15	17:00:00	LPRSA0189724	PAP-00456119	
8/2/1952 15:40	8/3/1952 8:45	17:05:00	LPRSA0189725	PAP-00456120	
8/6/1952 14:15	8/6/1952 19:45	5:30:00	LPRSA0189715	PAP-00456110	
8/8/1952 13:15	8/9/1952 14:15	25:00:00	LPRSA0189715	PAP-00456110	
8/10/1952 8:45	8/11/1952 8:15	23:30:00	LPRSA0189716	PAP-00456112-113	
8/11/1952 16:45	8/12/1952 8:15	15:30:00	LPRSA0189719	PAP-00456114-115	
8/12/1952 16:15	8/13/1952 8:15	16:00:00	LPRSA0189721	PAP-00456116-117	
8/13/1952 16:45	8/14/1952 8:15	15:30:00	LPRSA0189720	PAP-00456117-118	
8/15/1952 16:15	8/17/1952 8:15	40:00:00	LPRSA0189714	PAP-00456109	
8/21/1952 15:45	8/22/1952 9:15	17:30:00	LPRSA0189713	PAP-00456108	
8/30/1952 9:15	9/2/1952 8:15	71:00:00	LPRSA0189712	PAP-00456107	
9/2/1952 16:15	9/3/1952 13:15	21:00:00	LPRSA0189711	PAP-00456106	
9/15/1952 15:15	9/17/1952 16:15	49:00:00	LPRSA0189709	PAP-00456104	
9/18/1952 12:15	9/20/1952 8:15	44:00:00	LPRSA0189710	PAP-00456105	
9/23/1952 9:45	9/23/1952 13:15	3:30:00	LPRSA0189708	PAP-00456103	
10/2/1952 18:15	10/2/1952 22:00	3:45:00	LPRSA0189707	PAP-00456102	
10/28/1952 16:45	10/29/1952 8:15	15:30:00	LPRSA0189706	PAP-00456101	
11/2/1952 8:30	11/2/1952 13:30	5:00:00	LPRSA0189705	PAP-00456100	
11/3/1952 13:15	11/4/1952 8:15	19:00:00	LPRSA0189703	PAP-00456098	
11/10/1952 15:45	11/11/1952 8:15	16:30:00	LPRSA0189704	PAP-00456099	
12/2/1952 13:15	12/5/1952 17:15	76:00:00	LPRSA0189702	PAP-00456097	
12/9/1952 10:45	1/18/1953 16:30	965:45:00	LPRSA0189655	PAP-00456556	
1/21/1953 14:15	1/22/1953 8:15	18:00:00	LPRSA0189656	PAP-00456557	
1/24/1953 9:15	1/24/1953 15:15	6:00:00	LPRSA0189657	PAP-00456558	
2/11/1953 16:45	2/13/1953 9:45	41:00:00	LPRSA0189658	PAP-00456559	
2/15/1953 10:15	2/15/1953 15:45	5:30:00	LPRSA0189659	PAP-00456560	
2/21/1953 8:15	2/22/1953 20:30	36:15:00	LPRSA0189660	PAP-00456561	
2/25/1953 8:15	3/10/1953 18:45	322:30:00	LPRSA0189661	PAP-00456562	
3/15/1953 0:15	3/23/1953 13:15	205:00:00	LPRSA0189664	PAP-00456155	
3/24/1953 9:00	3/25/1953 19:45	34:45:00	LPRSA0189664	PAP-00456155	
3/30/1953 14:15	3/31/1953 9:30	19:15:00	LPRSA0189664	PAP-00456155	
5/5/1953 16:30	5/6/1953 11:30	19:00:00	LPRSA0189664	PAP-00456155	
5/8/1953 10:00	5/9/1953 9:15	23:15:00	LPRSA0189664	PAP-00456155	
5/13/1953 9:45	5/14/1953 9:30	23:45:00	LPRSA0189664	PAP-00456155	
5/14/1953 15:00	5/15/1953 11:30	20:30:00	LPRSA0189664	PAP-00456155	
5/24/1953 12:00	5/25/1953 10:00	22:00:00	LPRSA0189664	PAP-00456155	
7/6/1953 19:45	7/7/1953 8:15	12:30:00	LPRSA0189681	PAP-00456570	
7/20/1953 21:10	7/21/1953 8:30	11:20:00	LPRSA0189682	PAP-00456571	
10/27/1953 16:30	10/28/1953 14:15	21:45:00	LPRSA0189692	PAP-00456581	
10/29/1953 13:45	10/29/1953 16:00	2:15:00	LPRSA0189693	PAP-00456582	
11/7/1953 6:45	11/8/1953 14:15	31:30:00	LPRSA0189695	PAP-00456584	
12/6/1953 11:30	12/7/1953 8:20	20:50:00	LPRSA0189650	PAP-00456551	
12/14/1953 5:45	12/14/1953 12:15	6:30:00	LPRSA0189647	PAP-00456548	
12/28/1953 16:30	12/29/1953 9:15	16:45:00	LPRSA0189646	PAP-00456547	
1/14/1954 16:15	1/18/1954 9:15	89:00:00	LPRSA0189592	PAP-00456493	

**Exhibit 1b. Documented PVSC Bypasses at Verona Avenue
(Newark)**

1/18/1954 14:15	1/21/1954 9:30	67:15:00	LPRSA0189591	PAP-00456492	
1/22/1954 15:15	1/25/1954 9:30	66:15:00	LPRSA0189590	PAP-00456491	
1/25/1954 14:15	2/2/1954 9:45	187:30:00	LPRSA0189590	PAP-00456491	
2/3/1954 13:00	2/4/1954 9:00	20:00:00	LPRSA0189589	PAP-00456490	
2/8/1954 17:15	2/9/1954 9:15	16:00:00	LPRSA0189588	PAP-00456489	
2/16/1954 16:45	2/17/1954 13:30	20:45:00	LPRSA0189587	PAP-00456488	
2/21/1954 17:00	2/22/1954 8:30	15:30:00	LPRSA0189586	PAP-00456487	
2/23/1954 11:45	2/24/1954 13:00	25:15:00	LPRSA0189621	PAP-00456522	
3/19/1954 16:15	3/20/1954 14:30	22:15:00	LPRSA0189617	PAP-00456518	
4/13/1954 12:15	4/13/1954 15:30	3:15:00	LPRSA0189623	PAP-00456524	
4/16/1954 13:00	4/18/1954 10:00	45:00:00	LPRSA0189632	PAP-00456533	
4/23/1954 13:15	4/25/1954 9:15	44:00:00	LPRSA0189614	PAP-00456515	
5/7/1954 10:30	5/14/1954 16:00	173:30:00	LPRSA0189631	PAP-00456532	
6/3/1954 16:45	6/9/1954 9:30	136:45:00	LPRSA0189630	PAP-00456531	
7/7/1954 16:15	7/8/1954 9:15	17:00:00	LPRSA0189624	PAP-00456525	
8/3/1954 9:00	8/4/1954 9:00	24:00:00	LPRSA0189620	PAP-00456521	
8/9/1954 8:45	8/9/1954 13:45	5:00:00	LPRSA0189622	PAP-00456523	
8/20/1954 16:15	8/22/1954 8:15	40:00:00	LPRSA0189610	PAP-00456511	
8/25/1954 16:30	8/26/1954 9:00	16:30:00	LPRSA0189609	PAP-00456510	
8/30/1954 16:30	9/1/1954 9:15	40:45:00	LPRSA0189608	PAP-00456509	
9/8/1954 14:15	9/9/1954 9:00	18:45:00	LPRSA0189607	PAP-00456508	
9/10/1954 13:15	9/12/1954 9:00	43:45:00	LPRSA0189606	PAP-00456507	
9/14/1954 15:45	9/18/1954 9:00	89:15:00	LPRSA0189605	PAP-00456506	
10/4/1954 8:45	10/8/1954 15:45	103:00:00	LPRSA0189604	PAP-00456505	
10/27/1954 16:15	10/28/1954 9:15	17:00:00	LPRSA0189602	PAP-00456503	
10/29/1954 9:15	10/30/1954 8:45	23:30:00	LPRSA0189601	PAP-00456502	
11/2/1954 12:45	11/4/1954 9:00	44:15:00	LPRSA0189600	PAP-00456501	
11/8/1954 13:00	11/9/1954 13:00	24:00:00	LPRSA0189599	PAP-00456500	
11/15/1954 9:30	11/29/1954 9:30	336:00:00	LPRSA0189597	PAP-00456498	
12/9/1954 13:45	12/9/1954 17:45	4:00:00	LPRSA0189596	PAP-00456497	
12/14/1954 9:15	12/14/1954 15:45	6:30:00	LPRSA0189595	PAP-00456496	
12/16/1954 14:00	12/16/1954 20:00	6:00:00	LPRSA0189594	PAP-00456495	
12/18/1954 10:15	12/19/1954 8:15	22:00:00	LPRSA0189593	PAP-00456494	
12/29/1954 12:45	12/30/1954 15:00	26:15:00	LPRSA0189585	PAP-00456486	
1/6/1955 13:45	1/7/1955 9:00	19:15:00	LPRSA0189582	PAP-00456485	
1/28/1955 9:30	2/4/1955 10:00	168:30:00	LPRSA0189580	PAP-00456483	
2/14/1955 15:00	2/18/1955 16:15	97:15:00	LPRSA0189580	PAP-00456483	
2/21/1955 13:15	3/7/1955 9:30	332:15:00	LPRSA0189579	PAP-00456482	
3/7/1955 13:30	3/7/1955 16:00	2:30:00	LPRSA0189578	PAP-00456481	
3/21/1955 14:45	3/23/1955 13:30	46:45:00	LPRSA0189577	PAP-00456480	
3/28/1955 13:15	3/30/1955 16:15	51:00:00	LPRSA0189576	PAP-00456479	
4/6/1955 14:45	4/7/1955 16:00	25:15:00	LPRSA0189575	PAP-00456478	
4/12/1955 14:15	4/14/1955 13:15	47:00:00	LPRSA0189574	PAP-00456477	
5/31/1955 13:00	5/31/1955 18:00	5:00:00	LPRSA0189572	PAP-00456475	
6/21/1955 23:00	6/22/1955 8:15	9:15:00	LPRSA0189571	PAP-00456474	

Exhibit 1b. Documented PVSC Bypasses at Verona Avenue
(Newark)

8/7/1955 23:15	8/8/1955 2:30	3:15:00	LPRSA0189570	PAP-00456473	
8/11/1955 19:15	8/14/1955 8:30	61:15:00	LPRSA0189569	PAP-00456472	
8/15/1955 16:45	8/16/1955 14:30	21:45:00	LPRSA0189568	PAP-00456471	
8/18/1955 16:00	8/19/1955 2:45	10:45:00	LPRSA0189567	PAP-00456470	
8/21/1955 21:45	8/22/1955 9:15	11:30:00	LPRSA0189566	PAP-00456469	
8/24/1955 15:00	8/25/1955 9:00	18:00:00	LPRSA0189565	PAP-00456468	
8/25/1955 16:00	8/26/1955 9:30	17:30:00	LPRSA0189564	PAP-00456467	
9/24/1955 5:15	9/26/1955 8:15	51:00:00	LPRSA0189563	PAP-00456466	
10/6/1955 8:15	10/7/1955 11:00	26:45:00	LPRSA0189562	PAP-00456465	
10/14/1955 11:15	10/15/1955 14:45	27:30:00	LPRSA0189561	PAP-00456464	
10/16/1955 14:50	10/16/1955 20:30	5:40:00	LPRSA0189561	PAP-00456464	
10/17/1955 15:45	10/21/1955 13:30	93:45:00	LPRSA0189561	PAP-00456464	
10/30/1955 9:45	10/30/1955 16:25	6:40:00	LPRSA0189560	PAP-00456463	
11/10/1955 15:45	11/11/1955 1:15	9:30:00	LPRSA0189559	PAP-00456462	
11/11/1955 11:00	11/12/1955 8:30	21:30:00	LPRSA0189559	PAP-00456462	
11/16/1955 9:15	11/16/1955 14:15	5:00:00	LPRSA0189558	PAP-00456461	
1/30/1956 13:00	1/31/1956 8:15	19:15:00	LPRSA0189556	PAP-00456460	
2/2/1956 11:45	2/3/1956 8:15	20:30:00	LPRSA0189555	PAP-00456459	
2/6/1956 15:45	2/7/1956 12:30	20:45:00	LPRSA0189554	PAP-00456458	
2/18/1956 8:30	2/19/1956 8:00	23:30:00	LPRSA0189553	PAP-00456457	
3/8/1956 1:45	3/9/1956 8:30	30:45:00	LPRSA0189552	PAP-00456456	
3/14/1956 9:15	3/15/1956 9:00	23:45:00	LPRSA0189551	PAP-00456455	
3/21/1956 15:20	3/23/1956 14:00	46:40:00	LPRSA0189549	PAP-00456453	
3/29/1956 16:30	3/30/1956 9:00	16:30:00	LPRSA0189547	PAP-00456451	
4/7/1956 2:25	4/9/1956 13:15	58:50:00	LPRSA0189546	PAP-00456450	
4/11/1956 18:00	4/12/1956 8:20	14:20:00	LPRSA0189545	PAP-00456449	
5/2/1956 21:20	5/3/1956 9:00	11:40:00	LPRSA0189544	PAP-00456448	
6/2/1956 15:10	6/3/1956 12:00	20:50:00	LPRSA0189543	PAP-00456447	
6/27/1956 17:00	6/27/1956 18:10	1:10:00	LPRSA0189542	PAP-00456446	
7/16/1956 14:30	7/17/1956 9:00	18:30:00	LPRSA0189541	PAP-00456445	
7/21/1956 9:45	7/21/1956 21:50	12:05:00	LPRSA0189540	PAP-00456444	
7/27/1956 9:45	7/27/1956 15:15	5:30:00	LPRSA0189539	PAP-00456443	
8/6/1956 16:30	8/7/1956 8:15	15:45:00	LPRSA0189538	PAP-00456442	
8/21/1956 4:15	8/21/1956 16:00	11:45:00	LPRSA0189537	PAP-00456441	
9/6/1956 18:15	9/7/1956 8:00	13:45:00	LPRSA0189536	PAP-00456440	
9/7/1956 10:00	9/7/1956 16:30	6:30:00	LPRSA0189535	PAP-00456439	
9/27/1956 16:00	9/28/1956 8:15	16:15:00	LPRSA0189534	PAP-00456438	
10/22/1956 21:45	10/23/1956 8:15	10:30:00	LPRSA0189533	PAP-00456437	
10/31/1956 11:45	10/31/1956 19:30	7:45:00	LPRSA0189532	PAP-00456436	
11/1/1956 10:15	11/1/1956 16:00	5:45:00	LPRSA0189532	PAP-00456436	
11/18/1956 2:15	11/18/1956 11:00	8:45:00	LPRSA0189531	PAP-00456435	
11/22/1956 0:30	11/22/1956 8:00	7:30:00	LPRSA0189530	PAP-00456434	
12/9/1956 15:00	12/10/1956 8:30	17:30:00	LPRSA0189529	PAP-00456433	
12/14/1956 8:15	12/14/1956 16:00	7:45:00	LPRSA0189528	PAP-00456432	
12/22/1956 22:15	12/23/1956 10:00	11:45:00	LPRSA0189527	PAP-00456431	

Exhibit 1b. Documented PVSC Bypasses at Verona Avenue
(Newark)

1/23/1957 3:45	1/23/1957 12:00	8:15:00	LPRSA0189498	PAP-00456403	
2/9/1957 14:00	2/10/1957 8:45	18:45:00	LPRSA0189497	PAP-00456402	
2/26/1957 15:45	2/26/1957 22:30	6:45:00	LPRSA0189496	PAP-00456401	
3/1/1957 15:15	3/2/1957 10:30	19:15:00	LPRSA0189524	PAP-00456429	
3/8/1957 9:30	3/10/1957 9:50	48:20:00	LPRSA0189523	PAP-00456428	
3/15/1957 20:35	3/16/1957 9:35	13:00:00	LPRSA0189522	PAP-00456427	
3/19/1957 21:30	3/20/1957 15:30	18:00:00	LPRSA0189521	PAP-00456426	
4/2/1957 7:45	4/2/1957 13:45	6:00:00	LPRSA0189520	PAP-00456425	
4/4/1957 21:10	4/5/1957 10:45	13:35:00	LPRSA0189519	PAP-00456424	
4/5/1957 14:15	4/6/1957 13:20	23:05:00	LPRSA0189518	PAP-00456423	
4/9/1957 9:00	4/9/1957 15:45	6:45:00	LPRSA0189516	PAP-00456421	
4/10/1957 9:00	4/10/1957 15:45	6:45:00	LPRSA0189515	PAP-00456420	
4/11/1957 8:15	4/11/1957 15:45	7:30:00	LPRSA0189514	PAP-00456419	
4/12/1957 8:15	4/12/1957 16:00	7:45:00	LPRSA0189513	PAP-00456418	
4/18/1957 22:00	4/19/1957 13:30	15:30:00	LPRSA0189512	PAP-00456417	
4/23/1957 6:55	4/23/1957 14:00	7:05:00	LPRSA0189511	PAP-00456416	
4/25/1957 16:00	4/26/1957 9:30	17:30:00	LPRSA0189510	PAP-00456415	
4/29/1957 13:15	4/29/1957 15:45	2:30:00	LPRSA0189509	PAP-00456414	
5/14/1957 21:00	5/15/1957 10:45	13:45:00	LPRSA0189508	PAP-00456413	
5/16/1957 0:00	8/25/1957 23:59				data missing
8/26/1957 1:30	8/26/1957 19:00	17:30:00	LPRSA0189507	PAP-00456412	
9/10/1957 22:45	9/11/1957 8:45	10:00:00	LPRSA0189506	PAP-00456411	
9/17/1957 0:00	9/17/1957 9:15	9:15:00	LPRSA0189505	PAP-00456410	
9/18/1957 0:00	12/19/1957 23:59				data missing
10/23/1958 2:15	10/23/1958 15:20	13:05:00	LPRSA0189469	PAP-00456170	
10/25/1958 19:00	10/27/1958 13:30	42:30:00	LPRSA0189468	PAP-00456169	
3/6/1959 2:15	3/6/1959 16:15	14:00:00	LPRSA0189458	PAP-00456227	
6/2/1959 18:30	6/3/1959 8:00	13:30:00	LPRSA0189454	PAP-00456223	
9/1/1959 18:30	9/2/1959 8:00	13:30:00	LPRSA0189445	PAP-00456214	
11/24/1959 16:15	11/25/1959 8:25		LPRSA0189432	PAP-00456201	Moved to Union tab
12/7/1959 2:30	12/7/1959 10:00	7:30:00	LPRSA0189431	PAP-00456200	
2/19/1960 1:40	2/19/1960 10:15	8:35:00	LPRSA0189421	PAP-00456264	
4/3/1960 22:00	4/4/1960 8:30	10:30:00	LPRSA0189416	PAP-00456259	
7/30/1960 9:45	7/31/1960 9:00	23:15:00	LPRSA0189402	PAP-00456245	
8/19/1960 15:45	8/20/1960 9:05	17:20:00	LPRSA0189399	PAP-00456242	
9/12/1960 9:45	9/13/1960 8:30	22:45:00	LPRSA0189397	PAP-00456240	
9/19/1960 10:30	9/19/1960 15:45	5:15:00	LPRSA0189396	PAP-00456239	
12/21/1960 11:35	12/22/1960 9:30	21:55:00	LPRSA0189391	PAP-00456234	
1/1/1961 9:15	1/2/1961 9:00	23:45:00	LPRSA0189389	PAP-00456730	
3/14/1961 8:15	3/14/1961 13:00	4:45:00	LPRSA0189382	PAP-00456723	
3/23/1961 13:45	3/24/1961 10:30	20:45:00	LPRSA0189383	PAP-00456724	
4/10/1961 10:50	4/10/1961 15:15	4:25:00	LPRSA0189376	PAP-00456717	
4/13/1961 6:05	4/13/1961 15:15	9:10:00	LPRSA0189375	PAP-00456716	
4/16/1961 12:05	4/17/1961 8:15	20:10:00	LPRSA0189373	PAP-00456714	
4/24/1961 10:00	4/24/1961 14:30	4:30:00	LPRSA0189370	PAP-00456711	

Exhibit 1b. Documented PVSC Bypasses at Verona Avenue
(Newark)

9/20/1961 15:30	9/21/1961 15:00	23:30:00	LPRSA0189348	PAP-00456689	
12/18/1961 11:15	12/20/1961 8:30	45:15:00	LPRSA0189338	PAP-00456679	
2/26/1962 15:30	2/27/1962 8:15	16:45:00	LPRSA0189329	PAP-00456321	
2/27/1962 13:30	2/28/1962 15:15	25:45:00	LPRSA0189329	PAP-00456321	
3/12/1962 10:05	3/13/1962 8:20	22:15:00	LPRSA0189327	PAP-00456319	
3/21/1962 15:05	3/22/1962 8:30	17:25:00	LPRSA0189326	PAP-00456318	
4/7/1962 14:50	4/9/1962 8:30	41:40:00	LPRSA0189324	PAP-00456316	
4/9/1962 15:40	4/10/1962 8:20	16:40:00	LPRSA0189323	PAP-00456315	
9/27/1962 14:15	9/28/1962 13:30	23:15:00	LPRSA0189296	PAP-00456288	
10/5/1962 9:20	10/7/1962 9:35	48:15:00	LPRSA0189295	PAP-00456287	
10/23/1962 11:20	10/23/1962 15:45	4:25:00	LPRSA0189291	PAP-00456283	
10/25/1962 22:45	10/26/1962 15:00	16:15:00	LPRSA0189290	PAP-00456282	
10/30/1962 15:00	10/31/1962 10:30	19:30:00	LPRSA0189289	PAP-00456281	
11/3/1962 10:00	11/5/1962 8:10	46:10:00	LPRSA0189288	PAP-00456280	
11/18/1962 12:45	11/19/1962 8:15	19:30:00	LPRSA0189285	PAP-00456277	
11/21/1962 22:10	11/23/1962 9:15	35:05:00	LPRSA0189284	PAP-00456276	
12/5/1962 8:30	12/6/1962 15:00	30:30:00	LPRSA0189283	PAP-00456275	
Subtotal 1950-1962 Koch Report		8516:55:00			
Subtotal 1950-1962 Throw out logs		8484:45:00			
Koch report 1975 (PAP-00488413)					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates number	Comments
1/1/1975	1/1/1975	0:00:00	LPRSA0196644	PAP-00456743	data missing
6/29/1975	6/29/1975	0:00:00	LPRSA0196645	PAP-00456744	data missing
6/30/1975	12/31/2004	0:00:00			data missing

Exhibit 1c. Documented PVSC Bypasses at 4th Avenue
(Newark)

Allocation Report			
	Time of bypasses	Time observed	% of Total Time
1950-1962	12912:05:00	107270:30:00	12.04%
1974-1975	558:25:00	8334:00:00	6.70%
Total	13470:30:00	115604:30:00	11.65%

Koch report 1950-1962 (PAP-00488422 - PAP-00488428)					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates Number (throw-out logs)	Comments
10/4/1950 22:00	10/5/1950 11:30	13:30:00	LPRSA0188654	PAP-00456399	
10/10/1950 2:30	10/10/1950 8:30	6:00:00	LPRSA0188652	PAP-00456397	
10/12/1950 13:30	10/13/1950 9:30	20:00:00	LPRSA0188650	PAP-00456395	
10/23/1950 13:30	10/24/1950 9:00	19:30:00	LPRSA0188648	PAP-00456393	
11/20/1950 18:00	11/21/1950 9:00	15:00:00	LPRSA0188646	PAP-00456391	
11/25/1950 9:00	11/25/1950 13:00	4:00:00	LPRSA0188643	PAP-00456388	
12/4/1950 12:30	12/4/1950 21:00	8:30:00	LPRSA0188641	PAP-00456386	
12/7/1950 16:00	12/8/1950 11:30	19:30:00	LPRSA0188637	PAP-00456382	
12/15/1950 22:30	12/16/1950 9:00	10:30:00	LPRSA0188639	PAP-00456384	
12/29/1950 12:30	12/30/1950 11:30	23:00:00	LPRSA0188635	PAP-00456380	
1/7/1951 17:00	1/8/1951 9:00	16:00:00	LPRSA0188633	PAP-00456378	
1/11/1951 17:30	1/12/1951 8:30	15:00:00	LPRSA0188619	PAP-00456364	
1/14/1951 18:00	1/15/1951 12:00	18:00:00	LPRSA0188631	PAP-00456376	
1/23/1951 2:00	1/24/1951 14:00	36:00:00	LPRSA0188621	PAP-00456366	
1/25/1951 16:00	1/25/1951 19:00	3:00:00	LPRSA0188623	PAP-00456368	
1/28/1951 17:00	1/29/1951 8:30	15:30:00	LPRSA0188625	PAP-00456370	
1/29/1951 19:30	1/30/1951 10:00	14:30:00	LPRSA0188625	PAP-00456370	
1/31/1951 16:00	2/2/1951 10:00	42:00:00	LPRSA0188628	PAP-00456373	
2/7/1951 11:00	2/8/1951 14:30	27:30:00	LPRSA0188585	PAP-00456085; PAP-00456330	
2/10/1951 5:30	2/10/1951 12:00	6:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/11/1951 18:00	2/13/1951 13:30	43:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/13/1951 19:45	2/14/1951 10:00	14:15:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/14/1951 17:45	2/15/1951 9:30	15:45:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/17/1951 4:00	2/18/1951 11:30	31:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/19/1951 17:00	2/20/1951 14:30	21:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
2/22/1951 10:30	2/22/1951 11:45	1:15:00	LPRSA0188596	PAP-00456064; PAP-00456341	

2/23/1951 8:30	2/23/1951 10:00	1:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
3/1/1951 15:00	3/2/1951 10:00	19:00:00	LPRSA0188604	PAP-00456349	
3/3/1951 15:00	3/5/1951 10:30	43:30:00	LPRSA0188606	PAP-00456351	
3/13/1951 16:30	3/15/1951 9:30	41:00:00	LPRSA0188609	PAP-00456354	
3/16/1951 16:00	3/19/1951 9:30	65:30:00	LPRSA0188612	PAP-00456357	
3/19/1951 17:00	3/20/1951 12:00	19:00:00	LPRSA0188616	PAP-00456361	
3/22/1951 0:00	12/31/1951 23:59				data missing
2/17/1952 3:30	2/18/1952 9:00	29:30:00	LPRSA0189755	PAP-00456150	
2/20/1952 18:00	2/21/1952 13:30	19:30:00	LPRSA0189754	PAP-00456149	
2/29/1952 21:00	3/3/1952 11:00	62:00:00	LPRSA0189753	PAP-00456148	
3/3/1952 17:30	3/5/1952 14:30	45:00:00	LPRSA0189753	PAP-00456148	
3/11/1952 5:00	3/17/1952 14:00	153:00:00	LPRSA0189752	PAP-00456147	
3/19/1952 10:30	3/21/1952 11:00	48:30:00	LPRSA0189751	PAP-00456146	
3/22/1952 17:00	3/25/1952 10:30	65:30:00	LPRSA0189750	PAP-00456145	
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10/25/1958 18:30	10/27/1958 14:00	43:30:00	LPRSA0189468	PAP-00456169	
11/28/1958 22:15	11/29/1958 12:15	14:00:00	LPRSA0189466	PAP-00456167	
3/6/1959 9:15	3/7/1959 10:30	25:15:00	LPRSA0189458	PAP-00456227	
5/13/1959 19:30	5/14/1959 8:45	13:15:00	LPRSA0189438	PAP-00456207	
6/2/1959 18:00	6/3/1959 9:45	15:45:00	LPRSA0189454	PAP-00456223	
8/5/1959 11:15	8/6/1959 9:30	22:15:00	LPRSA0189448	PAP-00456217	
8/9/1959 5:15	8/9/1959 6:45	1:30:00	LPRSA0189447	PAP-00456216	
8/31/1959 13:45	9/3/1959 9:45	68:00:00	LPRSA0189445	PAP-00456214	
10/1/1959 13:30	10/2/1959 8:30	19:00:00	LPRSA0189443	PAP-00456212	
10/9/1959 12:00	10/10/1959 14:30	26:30:00	LPRSA0189440	PAP-00456209	
10/24/1959 10:45	10/25/1959 11:00	24:15:00	LPRSA0189435	PAP-00456204	
11/24/1959 16:45	11/25/1959 10:40	17:55:00	LPRSA0189432	PAP-00456201	
12/7/1959 1:00	12/7/1959 8:45	7:45:00	LPRSA0189431	PAP-00456200	
12/12/1959 19:15	12/13/1959 9:45	14:30:00	LPRSA0189430	PAP-00456199	
12/29/1959 0:20	12/29/1959 8:45	8:25:00	LPRSA0189429	PAP-00456198	
2/6/1960 6:30	2/6/1960 13:45	7:15:00	LPRSA0189423	PAP-00456266	
2/11/1960 6:00	2/11/1960 12:45	6:45:00	LPRSA0189422	PAP-00456265	

2/18/1960 23:15	2/19/1960 15:30	16:15:00	LPRSA0189421	PAP-00456264	
2/26/1960 0:10	2/26/1960 14:10	14:00:00	LPRSA0189420	PAP-00456263	
4/3/1960 22:30	4/4/1960 11:40	13:10:00	LPRSA0189416	PAP-00456259	
7/14/1960 13:15	7/15/1960 10:15	21:00:00	LPRSA0189404	PAP-00456247	
10/20/1960 8:50	10/20/1960 15:30	6:40:00	LPRSA0189395	PAP-00456238	
11/10/1960 8:45	11/10/1960 15:45	7:00:00	LPRSA0189394	PAP-00456237	
12/12/1960 14:00	12/14/1960 13:30	47:30:00	LPRSA0189392	PAP-00456235	
12/21/1960 8:50	12/22/1960 9:15	24:25:00	LPRSA0189391	PAP-00456234	
1/1/1961 10:00	1/2/1961 10:00	24:00:00	LPRSA0189389	PAP-00456730	
3/9/1961 12:45	3/10/1961 8:40	19:55:00	LPRSA0189381	PAP-00456722	
3/14/1961 4:15	3/15/1961 13:20	33:05:00	LPRSA0189382	PAP-00456723	
3/23/1961 13:05	3/24/1961 13:50	24:45:00	LPRSA0189383	PAP-00456724	
4/10/1961 10:10	4/11/1961 14:20	28:10:00	LPRSA0189376	PAP-00456717	
4/13/1961 6:40	4/14/1961 14:35	31:55:00	LPRSA0189375	PAP-00456716	
4/16/1961 12:40	4/17/1961 13:20	24:40:00	LPRSA0189373	PAP-00456714	
4/18/1961 15:05	4/20/1961 13:45	46:40:00	LPRSA0189371	PAP-00456712	
4/24/1961 9:30	4/27/1961 8:30	71:00:00	LPRSA0189370	PAP-00456711	
7/15/1961 20:20	7/17/1961 8:40	36:20:00	LPRSA0189358	PAP-00456699	
7/20/1961 8:30	7/21/1961 8:35	24:05:00	LPRSA0189357	PAP-00456698	
8/3/1961 12:20	8/4/1961 10:50	22:30:00	LPRSA0189354	PAP-00456695	
8/21/1961 14:45	8/22/1961 8:40	17:55:00	LPRSA0189353	PAP-00456694	
8/23/1961 10:55	8/24/1961 13:45	26:50:00	LPRSA0189352	PAP-00456693	
9/19/1961 16:00	9/22/1961 11:05	67:05:00	LPRSA0189348	PAP-00456689	
11/24/1961 10:15	11/25/1961 10:25	24:10:00	LPRSA0189341	PAP-00456682	
12/18/1961 9:20	12/20/1961 13:20	52:00:00	LPRSA0189338	PAP-00456679	
12/28/1961 10:20	12/29/1961 8:30	22:10:00	LPRSA0189337	PAP-00456678	
1/6/1962 12:20	1/8/1962 13:35	49:15:00	LPRSA0189336	PAP-00456328	
1/15/1962 16:35	1/16/1962 8:30	15:55:00	LPRSA0189335	PAP-00456327	
1/26/1962 15:30	1/27/1962 10:10	18:40:00	LPRSA0189334	PAP-00456326	
2/24/1962 6:20	2/25/1962 11:45	29:25:00	LPRSA0189330	PAP-00456322	
2/26/1962 11:10	3/1/1962 15:00	75:50:00	LPRSA0189329	PAP-00456321	
3/6/1962 10:45	3/7/1962 9:05	22:20:00	LPRSA0189328	PAP-00456320	
3/12/1962 8:05	3/13/1962 13:20	29:15:00	LPRSA0189327	PAP-00456319	
3/21/1962 13:35	3/22/1962 9:10	19:35:00	LPRSA0189326	PAP-00456318	
4/1/1962 6:00	4/2/1962 10:50	28:50:00	LPRSA0189325	PAP-00456317	
4/7/1962 15:20	4/9/1962 9:05	41:45:00	LPRSA0189324	PAP-00456316	
4/9/1962 16:05	4/10/1962 8:50	16:45:00	LPRSA0189323	PAP-00456315	
6/5/1962 22:30	6/6/1962 8:40	10:10:00	LPRSA0189315	PAP-00456307	
6/13/1962 14:05	6/14/1962 8:40	18:35:00	LPRSA0189314	PAP-00456306	
6/26/1962 17:40	6/27/1962 8:50	15:10:00	LPRSA0189312	PAP-00456304	
7/18/1962 14:25	7/19/1962 8:30	18:05:00	LPRSA0189310	PAP-00456302	
8/7/1962 14:20	8/8/1962 8:45	18:25:00	LPRSA0189308	PAP-00456300	
8/9/1962 20:00	8/10/1962 15:20	19:20:00	LPRSA0189307	PAP-00456299	
8/10/1962 22:55	8/11/1962 13:30	14:35:00	LPRSA0189306	PAP-00456298	
8/17/1962 18:30	8/18/1962 9:55	15:25:00	LPRSA0189305	PAP-00456297	
8/21/1962 11:40	8/22/1962 13:30	25:50:00	LPRSA0189304	PAP-00456296	
8/28/1962 5:40	8/29/1962 13:35	31:55:00	LPRSA0189303	PAP-00456295	

9/5/1962 11:20	9/6/1962 8:30	21:10:00	LPRSA0189301	PAP-00456293	
9/17/1962 18:25	9/18/1962 8:40	14:15:00	LPRSA0189299	PAP-00456291	
9/27/1962 9:45	9/29/1962 11:00	49:15:00	LPRSA0189296	PAP-00456288	
10/5/1962 5:00	10/7/1962 10:10	53:10:00	LPRSA0189295	PAP-00456287	
10/23/1962 11:45	10/24/1962 10:40	22:55:00	LPRSA0189291	PAP-00456283	
10/25/1962 23:15	10/27/1962 10:15	35:00:00	LPRSA0189290	PAP-00456282	
10/30/1962 14:30	11/1/1962 14:45	48:15:00	LPRSA0189289	PAP-00456281	
11/3/1962 10:20	11/5/1962 8:40	46:20:00	LPRSA0189288	PAP-00456280	
11/9/1962 14:45	11/11/1962 10:15	43:30:00	LPRSA0189287	PAP-00456279	
11/13/1962 15:35	11/14/1962 8:40	17:05:00	LPRSA0189286	PAP-00456278	
11/18/1962 13:15	11/19/1962 15:15	26:00:00	LPRSA0189285	PAP-00456277	
11/21/1962 22:30	11/23/1962 9:35	35:05:00	LPRSA0189284	PAP-00456276	
12/5/1962 8:50	12/8/1962 9:30	72:40:00	LPRSA0189283	PAP-00456275	
12/22/1962 11:05	12/24/1962 9:15	46:10:00	LPRSA0189282	PAP-00456274	
12/29/1962 20:20	12/30/1962 12:30	16:10:00	LPRSA0189280	PAP-00456272	
1/1/1963 0:00	9/30/1974 23:59				data missing
Subtotal 1950-1962 Koch Report		12868:35:00			
Subtotal 1950-1962 Throw out Logs		12912:05:00			
Koch report 1974-1975 (PAP-00488429)					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates Number (throw-out logs)	
10/16/1974 4:00	10/17/1974 20:00	40:00:00	LPRSA0195712	PAP-00456733	
12/2/1974 1:00	12/3/1974 8:00	31:00:00	LPRSA0195714	PAP-00456734	
12/8/1974 13:00	12/9/1974 8:00	19:00:00	LPRSA0195714	PAP-00456734	
12/16/1974 11:00	12/17/1974 8:00	21:00:00	LPRSA0195714	PAP-00456734	
1/1/1975	1/1/1975	0:00:00	LPRSA0196788	PAP-00456747	data missing
1/9/1975 6:00	1/9/1975 13:00	7:00:00	LPRSA0195715	PAP-00456735	
1/13/1975 10:00	1/14/1975 8:00	22:00:00	LPRSA0195715	PAP-00456735	
1/18/1975 15:00	1/19/1975 6:00	15:00:00	LPRSA0195715	PAP-00456735	
1/29/1975	1/29/1975	5:00:00	LPRSA0196788	PAP-00456747	
1/29/1975 6:00	1/29/1975 15:00	4:00:00	LPRSA0195715	PAP-00456735	
2/24/1975	2/24/1975	8:04:48	LPRSA0196788	PAP-00456747	
2/24/1975 5:00	2/25/1975 6:00	16:55:12	LPRSA0195716	PAP-00456736	
3/12/1975	3/12/1975	5:25:00	LPRSA0196788	PAP-00456747	
3/19/1975	3/20/1975	12:00:00	LPRSA0196788	PAP-00456747	
3/19/1975 16:00	3/20/1975 12:00	8:00:00	LPRSA0195717	PAP-00456737	
4/3/1975	4/3/1975	6:45:00	LPRSA0196788	PAP-00456747	
4/3/1975 8:00	4/3/1975 17:00	2:15:00	LPRSA0195718	PAP-00456738	
4/24/1975	4/24/1975	3:27:36	LPRSA0196788	PAP-00456747	
4/24/1975 4:00	4/24/1975 8:00	0:32:24	LPRSA0195718	PAP-00456738	
4/24/1975	4/25/1975	1:34:48	LPRSA0196788	PAP-00456747	
4/25/1975 2:00	4/25/1975 9:00	5:25:12	LPRSA0195718	PAP-00456738	
5/13/1975	5/13/1975	1:45:00	LPRSA0196788	PAP-00456747	
5/13/1975 22:00	5/14/1975 9:00	9:15:00	LPRSA0195719	PAP-00456739	

6/1/1975 7:00	6/1/1975 16:00	9:00:00	LPRSA0195720	PAP-00456740	
6/5/1975	6/6/1975	12:05:24	LPRSA0196789	PAP-00456748	
6/5/1975 20:00	6/6/1975 11:00	2:54:36	LPRSA0195720	PAP-00456740	
6/6/1975	6/6/1975	6:00:00	LPRSA0196789	PAP-00456748	
6/6/1975 15:00	6/7/1975 8:00	11:00:00	LPRSA0195720	PAP-00456740	
6/12/1975 10:00	6/13/1975 8:00	22:00:00	LPRSA0195720	PAP-00456740	
7/4/1975 4:00	7/4/1975 12:00	8:00:00	LPRSA0195721	PAP-00456741	
7/7/1975 8:00	7/7/1975 22:00	14:00:00	LPRSA0195721	PAP-00456741	
7/9/1975 18:00	7/10/1975 2:00	8:00:00	LPRSA0195721	PAP-00456741	
7/13/1975 11:00	7/16/1975 17:00	78:00:00	LPRSA0195721	PAP-00456741	
7/25/1975 2:00	7/25/1975 14:00	12:00:00	LPRSA0195721	PAP-00456741	
9/23/1975 0:00	9/28/1975 10:00	130:00:00	LPRSA0195722	PAP-00456742	
10/1/1975	12/31/2004				data missing
Subtotal Koch report (1974-1975)		558:15:00			
Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.					

Exhibit 1e. Documented PVSC Bypasses at Clay Street
(Newark)

Allocation Report			
	Time of bypasses	Time observed	% of Total Time
1950-1962	14096:36:00	107270:10:00	13.14%
1974-1975	408:28:12	7575:00:00	5.39%
Total	14505:04:12	114845:10:00	12.63%

Koch report 1950-1962 (PAP-00488431 - PAP-00488437)					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates Number (throw-out logs)	Comments
10/4/1950 22:00	10/5/1950 11:30	13:30:00	LPRSA0188654	PAP-00456399	
10/10/1950 2:30	10/10/1950 8:30	6:00:00	LPRSA0188652	PAP-00456397	
10/12/1950 13:30	10/13/1950 9:30	20:00:00	LPRSA0188650	PAP-00456395	
10/23/1950 13:30	10/24/1950 9:00	19:30:00	LPRSA0188648	PAP-00456393	
11/20/1950 18:00	11/21/1950 9:00	15:00:00	LPRSA0188646	PAP-00456391	
11/25/1950 9:00	11/25/1950 13:00	4:00:00	LPRSA0188643	PAP-00456388	
12/4/1950 12:30	12/4/1950 21:00	8:30:00	LPRSA0188641	PAP-00456386	
12/7/1950 16:00	12/8/1950 11:30	19:30:00	LPRSA0188637	PAP-00456382	
12/15/1950 22:30	12/16/1950 9:00	10:30:00	LPRSA0188639	PAP-00456384	
12/29/1950 12:30	12/30/1950 11:30	23:00:00	LPRSA0188635	PAP-00456380	
1/7/1951 17:00	1/8/1951 9:00	16:00:00	LPRSA0188633	PAP-00456378	
1/11/1951 17:30	1/12/1951 8:30	15:00:00	LPRSA0188619	PAP-00456364	
1/14/1951 18:00	1/15/1951 12:00	18:00:00	LPRSA0188631	PAP-00456376	
1/23/1951 2:00	1/24/1951 14:00	36:00:00	LPRSA0188621	PAP-00456366	
1/25/1951 16:00	1/25/1951 19:00	3:00:00	LPRSA0188623	PAP-00456368	
1/28/1951 17:00	1/29/1951 8:30	15:30:00	LPRSA0188625	PAP-00456370	
1/29/1951 19:30	1/30/1951 10:00	14:30:00	LPRSA0188625	PAP-00456370	
1/31/1951 16:00	2/2/1951 10:00	42:00:00	LPRSA0188628	PAP-00456373	
2/7/1951 11:00	2/8/1951 14:30	27:30:00	LPRSA0188585	PAP-00456085; PAP-00456330	
2/10/1951 5:30	2/10/1951 12:00	6:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/11/1951 18:00	2/13/1951 13:30	43:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/13/1951 19:45	2/14/1951 10:00	14:15:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/14/1951 17:45	2/15/1951 9:30	15:45:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/17/1951 4:00	2/18/1951 11:30	31:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/19/1951 17:00	2/20/1951 14:30	21:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
2/22/1951 10:30	2/22/1951 11:45	1:15:00	LPRSA0188596	PAP-00456064; PAP-00456341	

2/23/1951 8:30	2/23/1951 10:00	1:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
	2/24/1951 9:30		LPRSA0188596	PAP-00456064; PAP-00456341	No start time provided in document. Entry not included by contractor
3/1/1951 13:00	3/2/1951 10:00	21:00:00	LPRSA0188604	PAP-00456349	
3/3/1951 15:00	3/5/1951 10:30	43:30:00	LPRSA0188606	PAP-00456351	
3/13/1951 16:30	3/14/1951 15:00	22:30:00	LPRSA0188609	PAP-00456354	
3/16/1951 16:00	3/19/1951 9:30	65:30:00	LPRSA0188612	PAP-00456357	
3/19/1951 17:00	3/20/1951 12:00	19:00:00	LPRSA0188616	PAP-00456361	
3/22/1951 0:00	12/31/1951 23:59				data missing
2/17/1952 3:30	2/18/1952 9:00	29:30:00	LPRSA0189755	PAP-00456150	
2/20/1952 18:00	2/21/1952 14:00	20:00:00	LPRSA0189754	PAP-00456149	
2/29/1952 21:00	3/3/1952 11:00	62:00:00	LPRSA0189753	PAP-00456148	
3/3/1952 17:30	3/5/1952 14:30	45:00:00	LPRSA0189753	PAP-00456148	
3/11/1952 5:00	3/17/1952 14:00	153:00:00	LPRSA0189752	PAP-00456147	
3/19/1952 10:30	3/20/1952 14:00	27:30:00	LPRSA0189751	PAP-00456146	
3/22/1952 17:00	3/25/1952 10:30	65:30:00	LPRSA0189750	PAP-00456145	
4/4/1952 17:30	4/6/1952 11:00	41:30:00	LPRSA0189749	PAP-00456144	
4/14/1952 4:00	4/16/1952 11:00	55:00:00	LPRSA0189748	PAP-00456143	
4/23/1952 18:00	4/24/1952 11:00	17:00:00	LPRSA0189747	PAP-00456142	
4/25/1952 11:00	4/25/1952 20:00	9:00:00	LPRSA0189744	PAP-00456139	
4/26/1952 14:30	4/28/1952 17:30	51:00:00	LPRSA0189744	PAP-00456139	
4/29/1952 15:00	5/7/1952 14:00	191:00:00	LPRSA0189744	PAP-00456139-40	
5/11/1952 22:00	5/13/1952 11:30	37:30:00	LPRSA0189743	PAP-00456138	
5/18/1952 8:00	5/23/1952 14:30	126:30:00	LPRSA0189741	PAP-00456136	
5/13/1952 15:30	5/14/1952 10:00	18:30:00	LPRSA0189743	PAP-00456138	
5/25/1952 9:30	5/27/1952 9:30	48:00:00	LPRSA0189740	PAP-00456135	
5/29/1952 15:30	6/3/1952 10:30	115:00:00	LPRSA0189738	PAP-00456133	
6/3/1952 11:45	6/6/1952 10:00	70:15:00	LPRSA0189736	PAP-00456131	
6/9/1952 9:15	6/14/1952 9:45	120:30:00	LPRSA0189737	PAP-00456132	
6/17/1952 17:30	6/18/1952 11:30	18:00:00	LPRSA0189735	PAP-00456130	
6/19/1952 15:15	6/20/1952 9:45	18:30:00	LPRSA0189734	PAP-00456129	
6/27/1952 16:10	6/28/1952 8:45	16:35:00	LPRSA0189729	PAP-00456124	
6/29/1952 1:00	6/30/1952 10:00	33:00:00	LPRSA0189728	PAP-00456123	
7/8/1952 16:15	7/10/1952 10:00	41:45:00	LPRSA0189730	PAP-00456125	
7/21/1952 16:30	7/22/1952 10:30	18:00:00	LPRSA0189726	PAP-00456121	
7/31/1952 17:00	8/1/1952 10:00	17:00:00	LPRSA0189724	PAP-00456119	
8/2/1952 16:15	8/3/1952 9:30	17:15:00	LPRSA0189725	PAP-00456120	
8/6/1952 15:15	8/11/1952 9:15	114:00:00	LPRSA0189715	PAP-00456110, 113	
8/11/1952 17:30	8/12/1952 9:00	15:30:00	LPRSA0189719	PAP-00456114-115	
8/12/1952 17:15	8/13/1952 9:00	15:45:00	LPRSA0189721	PAP-00456116-117	
8/13/1952 17:00	8/14/1952 9:00	16:00:00	LPRSA0189720	PAP-00456110-118	
8/15/1952 17:00	8/17/1952 9:00	40:00:00	LPRSA0189714	PAP-00456109	
8/21/1952 16:30	8/22/1952 10:00	17:30:00	LPRSA0189713	PAP-00456108	
8/30/1952 10:00	9/2/1952 9:00	71:00:00	LPRSA0189712	PAP-00456107	
9/2/1952 17:00	9/3/1952 14:00	21:00:00	LPRSA0189711	PAP-00456106	
9/15/1952 16:15	9/17/1952 17:00	48:45:00	LPRSA0189709	PAP-00456104	

9/18/1952 13:00	9/20/1952 9:00	44:00:00	LPRSA0189710	PAP-00456105	
9/23/1952 10:30	9/23/1952 14:00	3:30:00	LPRSA0189708	PAP-00456103	
10/2/1952 19:00	10/3/1952 13:30	18:30:00	LPRSA0189707	PAP-00456102	
10/28/1952 17:30	10/29/1952 9:00	15:30:00	LPRSA0189706	PAP-00456101	
11/2/1952 9:15	11/2/1952 14:15	5:00:00	LPRSA0189705	PAP-00456100	
11/3/1952 14:00	11/4/1952 9:00	19:00:00	LPRSA0189703	PAP-00456098	
11/10/1952 16:30	11/11/1952 9:00	16:30:00	LPRSA0189704	PAP-00456099	
11/14/1952 13:30	12/1/1952 13:30	408:00:00	LPRSA0189701	PAP-00456096	
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2/6/1960 6:15	2/6/1960 13:30	7:15:00	LPRSA0189423	PAP-00456266	
2/18/1960 23:00	2/19/1960 15:15	16:15:00	LPRSA0189421	PAP-00456264	
2/25/1960 23:30	2/26/1960 13:30	14:00:00	LPRSA0189420	PAP-00456263	
3/17/1960 15:45	3/18/1960 8:20	16:35:00	LPRSA0189418	PAP-00456261	
4/3/1960 22:10	4/4/1960 11:25	13:15:00	LPRSA0189416	PAP-00456259	
4/18/1960 13:00	4/18/1960 15:45	2:45:00	LPRSA0189412	PAP-00456255	
7/14/1960 13:00	7/15/1960 10:00	21:00:00	LPRSA0189404	PAP-00456247	
7/30/1960 10:10	7/31/1960 9:20	23:10:00	LPRSA0189402	PAP-00456245	
8/19/1960 8:30	8/20/1960 9:30	25:00:00	LPRSA0189399	PAP-00456242	
9/12/1960 0:30	9/13/1960 9:10	32:40:00	LPRSA0189397	PAP-00456240	
9/19/1960 10:50	9/21/1960 21:30	58:40:00	LPRSA0189396	PAP-00456239	
10/20/1960 9:15	10/21/1960 8:30	23:15:00	LPRSA0189395	PAP-00456238	
11/10/1960 8:30	11/10/1960 15:30	7:00:00	LPRSA0189394	PAP-00456237	
12/12/1960 12:20	12/14/1960 12:30	48:10:00	LPRSA0189392	PAP-00456235	
12/21/1960 9:15	12/22/1960 9:30	24:15:00	LPRSA0189391	PAP-00456234	
1/1/1961 10:30	1/2/1961 10:40	24:10:00	LPRSA0189389	PAP-00456730	
3/9/1961 12:55	3/10/1961 9:10	20:15:00	LPRSA0189381	PAP-00456722	
3/14/1961 4:45	3/15/1961 13:35	32:50:00	LPRSA0189382	PAP-00456723	
3/23/1961 12:45	3/24/1961 13:30	24:45:00	LPRSA0189383	PAP-00456724	
4/10/1961 10:30	4/11/1961 14:40	28:10:00	LPRSA0189376	PAP-00456717	
4/13/1961 6:25	4/14/1961 14:15	31:50:00	LPRSA0189375	PAP-00456716	
4/16/1961 12:25	4/17/1961 13:00	24:35:00	LPRSA0189373	PAP-00456714	
4/18/1961 14:45	4/20/1961 14:00	47:15:00	LPRSA0189371	PAP-00456712	
4/24/1961 9:15	4/27/1961 8:50	71:35:00	LPRSA0189370	PAP-00456711	
7/15/1961 20:00	7/17/1961 9:00	37:00:00	LPRSA0189358	PAP-00456699	

7/20/1961 8:50	7/21/1961 8:50	24:00:00	LPRSA0189357	PAP-00456698	
8/3/1961 12:00	8/4/1961 10:30	22:30:00	LPRSA0189354	PAP-00456695	
8/21/1961 14:30	8/22/1961 9:00	18:30:00	LPRSA0189353	PAP-00456694	
8/23/1961 10:40	8/24/1961 13:30	26:50:00	LPRSA0189352	PAP-00456693	
9/15/1961 10:30	9/15/1961 14:45	4:15:00	LPRSA0189349	PAP-00456690	
9/19/1961 15:15	9/22/1961 10:50	67:35:00	LPRSA0189348	PAP-00456689	
11/24/1961 9:45	11/25/1961 10:10	24:25:00	LPRSA0189341	PAP-00456682	
12/18/1961 9:40	12/20/1961 13:00	51:20:00	LPRSA0189338	PAP-00456679	
12/28/1961 10:05	12/29/1961 8:50	22:45:00	LPRSA0189337	PAP-00456678	
1/6/1962 12:00	1/8/1962 13:15	49:15:00	LPRSA0189336	PAP-00456328	
1/15/1962 16:15	1/16/1962 8:45	16:30:00	LPRSA0189335	PAP-00456327	
1/26/1962 15:15	1/27/1962 9:45	18:30:00	LPRSA0189334	PAP-00456326	
2/24/1962 6:05	2/25/1962 11:30	29:25:00	LPRSA0189330	PAP-00456322	
2/26/1962 10:50	3/1/1962 8:20	69:30:00	LPRSA0189329	PAP-00456321	
3/6/1962 10:30	3/7/1962 8:45	22:15:00	LPRSA0189328	PAP-00456320	
3/12/1962 7:50	3/13/1962 13:00	29:10:00	LPRSA0189327	PAP-00456319	
3/21/1962 13:15	3/22/1962 9:30	20:15:00	LPRSA0189326	PAP-00456318	
4/1/1962 5:45	4/2/1962 11:10	29:25:00	LPRSA0189325	PAP-00456317	
4/7/1962 15:05	4/9/1962 8:50	41:45:00	LPRSA0189324	PAP-00456316	
4/9/1962 15:55	4/10/1962 8:35	16:40:00	LPRSA0189323	PAP-00456315	
6/5/1962 22:15	6/6/1962 9:00	10:45:00	LPRSA0189315	PAP-00456307	
6/13/1962 14:25	6/14/1962 9:00	18:35:00	LPRSA0189314	PAP-00456306	
6/26/1962 17:15	6/27/1962 9:10	15:55:00	LPRSA0189312	PAP-00456304	
7/18/1962 14:40	7/19/1962 8:45	18:05:00	LPRSA0189310	PAP-00456302	
8/7/1962 14:30	8/8/1962 9:00	18:30:00	LPRSA0189308	PAP-00456300	
8/9/1962 19:45	8/10/1962 15:00	19:15:00	LPRSA0189307	PAP-00456299	
8/10/1962 22:40	8/11/1962 13:00	14:20:00	LPRSA0189306	PAP-00456298	
8/17/1962 18:10	8/18/1962 9:35	15:25:00	LPRSA0189305	PAP-00456297	
8/21/1962 11:20	8/22/1962 13:10	25:50:00	LPRSA0189304	PAP-00456296	
8/28/1962 5:25	8/29/1962 13:50	32:25:00	LPRSA0189303	PAP-00456295	
9/5/1962 11:35	9/6/1962 8:45	21:10:00	LPRSA0189301	PAP-00456293	
9/17/1962 18:10	9/18/1962 9:00	14:50:00	LPRSA0189299	PAP-00456291	
9/27/1962 9:30	9/29/1962 10:45	49:15:00	LPRSA0189296	PAP-00456288	
10/5/1962 4:45	10/7/1962 9:50	53:05:00	LPRSA0189295	PAP-00456287	
10/23/1962 11:35	10/24/1962 10:30	22:55:00	LPRSA0189291	PAP-00456283	
10/25/1962 23:00	10/27/1962 9:55	34:55:00	LPRSA0189290	PAP-00456282	
10/30/1962 14:15	11/1/1962 14:30	48:15:00	LPRSA0189289	PAP-00456281	
11/3/1962 10:25	11/5/1962 9:00	46:35:00	LPRSA0189288	PAP-00456280	
11/9/1962 15:00	11/11/1962 10:30	43:30:00	LPRSA0189287	PAP-00456279	
11/13/1962 15:20	11/14/1962 8:55	17:35:00	LPRSA0189286	PAP-00456278	
11/18/1962 13:30	11/19/1962 15:00	25:30:00	LPRSA0189285	PAP-00456277	
11/21/1962 22:40	11/23/1962 9:45	35:05:00	LPRSA0189284	PAP-00456276	
12/5/1962 9:00	12/8/1962 9:45	72:45:00	LPRSA0189283	PAP-00456275	
12/22/1962 12:05	12/24/1962 9:30	45:25:00	LPRSA0189282	PAP-00456274	
12/29/1962 20:35	12/30/1962 12:10	15:35:00	LPRSA0189280	PAP-00456272	
Subtotal 1950-1962 Koch Report		14096:36:00			

Subtotal 1950-1962 Throw out Logs		14096:36:00			
Koch report (1974-1975) PAP-00488438 - PAP-00488439					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates number	Comments
9/13/1974 0:00	9/14/1974 0:00	0:00:00	LPRSA0196840	PAP-00456749	
10/16/1974 4:00	10/17/1974 21:00	41:00:00	LPRSA0195712	PAP-00456733	
12/2/1974 1:00	12/2/1974 8:00	7:00:00	LPRSA0195714	PAP-00456734	
12/8/1974 13:00	12/9/1974 8:00	19:00:00	LPRSA0195714	PAP-00456734	
12/16/1974 11:00	12/17/1974 8:00	21:00:00	LPRSA0195714	PAP-00456734	
1/9/1975 6:00	1/9/1975 13:00	7:00:00	LPRSA0195715	PAP-00456735	
1/13/1975 10:00	1/14/1975 9:00	23:00:00	LPRSA0195715	PAP-00456735	
1/18/1975 0:00	1/18/1975 0:00	15:15:00	LPRSA0196840	PAP-00456749	
1/18/1975 15:00	1/19/1975 6:00	0:00:00	LPRSA0195715	PAP-00456735	
1/29/1975 0:00	1/29/1975 0:00	9:37:48	LPRSA0196840	PAP-00456749	
1/29/1975 6:00	1/29/1975 16:00	0:22:12	LPRSA0195715	PAP-00456735	
2/24/1975	2/24/1975	10:37:12	LPRSA0196840	PAP-00456749	
2/24/1975 5:00	2/25/1975 6:00	14:22:48	LPRSA0195716	PAP-00456736	
3/12/1975 0:00	3/12/1975 0:00	5:00:00	LPRSA0196840	PAP-00456749	
3/19/1975 17:00	3/20/1975 13:00	20:00:00	LPRSA0195717	PAP-00456737	
4/3/1975	4/3/1975	3:30:00	LPRSA0196840	PAP-00456749	
4/3/1975 9:00	4/3/1975 17:00	4:30:00	LPRSA0195718	PAP-00456738	
4/24/1975 4:00	4/24/1975 9:00	5:00:00	LPRSA0195718	PAP-00456738	
4/24/1975	4/25/1975	6:55:12	LPRSA0196840	PAP-00456749	
4/25/1975 2:00	4/25/1975 9:00	0:04:48	LPRSA0195718	PAP-00456738	
5/13/1975	5/13/1975	10:13:12	LPRSA0196841	PAP-00456750	
5/13/1975 23:00	5/14/1975 9:00	0:00:00	LPRSA0195719	PAP-00456739	
6/1/1975 7:00	6/1/1975 17:00	10:00:00	LPRSA0195720	PAP-00456740	
6/5/1975 20:00	6/6/1975 11:00	15:00:00	LPRSA0195720	PAP-00456740	
6/6/1975 15:00	6/7/1975 8:00	17:00:00	LPRSA0195720	PAP-00456740	
6/12/1975 10:00	6/13/1975 9:00	23:00:00	LPRSA0195720	PAP-00456740	
7/4/1975 4:00	7/4/1975 12:00	8:00:00	LPRSA0195721	PAP-00456741	
7/7/1975 8:00	7/7/1975 22:00	14:00:00	LPRSA0195721	PAP-00456741	
7/9/1975 18:00	7/10/1975 2:00	8:00:00	LPRSA0195721	PAP-00456741	
7/13/1975 12:00	7/16/1975 17:00	77:00:00	LPRSA0195721	PAP-00456741	
7/25/1975 2:00	7/25/1975 15:00	13:00:00	LPRSA0195721	PAP-00456741	
Subtotal 1950-1962 Koch Report		408:28:12			
Subtotal 1950-1962 Allocation Report		408:28:12			

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

Exhibit 1h. Documented PVSC Bypasses at City Dock
(Newark)

Allocation Report			
	Time of bypasses	Time observed	% of Total Time
1950-1962	8695:55:00	87155:30:00	9.98%
1974-1975	0:00:00	0:00:00	0:00:00%
Total	8695:55:00	87155:30:00	9.98%

Koch report 1950-1962 (PAP-PAP-00488452 - PAP-00488454)					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates Number (throw-out logs)	Comments
10/4/1950 22:00	10/5/1950 11:30	13:30:00	LPRSA0188654	PAP-00456399	
10/10/1950 2:30	10/10/1950 13:00	10:30:00	LPRSA0188652	PAP-00456397	
10/12/1950 13:30	10/13/1950 11:00	21:30:00	LPRSA0188650	PAP-00456395	
10/23/1950 13:30	10/24/1950 9:00	19:30:00	LPRSA0188648	PAP-00456393	
11/20/1950 18:00	11/21/1950 9:00	15:00:00	LPRSA0188646	PAP-00456391	
11/25/1950 9:00	11/25/1950 13:00	4:00:00	LPRSA0188643	PAP-00456388	
12/4/1950 12:30	12/5/1950 9:30	21:00:00	LPRSA0188641	PAP-00456386	
12/7/1950 16:00	12/8/1950 11:30	19:30:00	LPRSA0188637	PAP-00456382	
12/15/1950 22:30	12/16/1950 14:30	16:00:00	LPRSA0188639	PAP-00456384	
12/29/1950 12:30	12/30/1950 11:30	23:00:00	LPRSA0188635	PAP-00456380	
1/7/1951 17:00	1/8/1951 9:00	16:00:00	LPRSA0188633	PAP-00456378	
1/11/1951 17:30	1/12/1951 8:30	15:00:00	LPRSA0188619	PAP-00456364	
1/14/1951 18:00	1/15/1951 12:00	18:00:00	LPRSA0188631	PAP-00456376	
1/23/1951 2:00	1/24/1951 14:00	36:00:00	LPRSA0188621	PAP-00456366	
1/25/1951 16:00	1/26/1951 10:00	18:00:00	LPRSA0188623	PAP-00456368	
1/28/1951 17:00	1/30/1951 10:00	41:00:00	LPRSA0188625	PAP-00456370	
1/31/1951 16:00	2/2/1951 10:00	42:00:00	LPRSA0188628	PAP-00456373	
2/10/1951 5:30	2/10/1951 14:30	9:00:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/11/1951 18:00	2/15/1951 14:30	92:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/17/1951 4:00	2/18/1951 11:30	31:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/19/1951 17:00	2/20/1951 14:30	21:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
2/23/1951 8:30	2/23/1951 10:00	1:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
	2/25/1951 10:00		LPRSA0188596	PAP-00456064; PAP-00456341	
3/1/1951 13:00	3/2/1951 10:00	21:00:00	LPRSA0188604	PAP-00456349	
3/3/1951 15:00	3/5/1951 10:30	43:30:00	LPRSA0188606	PAP-00456351	
3/13/1951 16:30	3/15/1951 9:30	41:00:00	LPRSA0188609	PAP-00456354	
3/16/1951 16:00	3/19/1951 9:30	65:30:00	LPRSA0188612	PAP-00456357	
3/19/1951 17:00	3/21/1951 9:00	40:00:00	LPRSA0188616	PAP-00456361	

3/22/1951 0:00	12/31/1951 23:59				data missing
2/17/1952 3:30	2/19/1952 11:00	55:30:00	LPRSA0189755	PAP-00456150	
2/20/1952 18:00	2/22/1952 10:30	40:30:00	LPRSA0189754	PAP-00456149	
2/29/1952 21:00	3/7/1952 10:30	157:30:00	LPRSA0189753	PAP-00456148	
3/11/1952 5:00	3/18/1952 10:30	173:30:00	LPRSA0189752	PAP-00456147	
3/19/1952 10:30	3/21/1952 11:00	48:30:00	LPRSA0189751	PAP-00456146	
3/22/1952 17:00	3/26/1952 11:00	90:00:00	LPRSA0189750	PAP-00456145	
4/5/1952 8:00	4/7/1952 11:00	51:00:00	LPRSA0189749	PAP-00456144	
4/14/1952 4:00	4/17/1952 11:00	79:00:00	LPRSA0189748	PAP-00456143	
4/23/1952 16:30	4/24/1952 11:30	19:00:00	LPRSA0189747	PAP-00456142	
4/25/1952 11:00	5/9/1952 16:30	341:30:00	LPRSA0189744	PAP-00456139, 141	
5/11/1952 22:00	5/14/1952 14:30	64:30:00	LPRSA0189743	PAP-00456138	
5/18/1952 8:45	5/23/1952 15:30	126:45:00	LPRSA0189741	PAP-00456136	
5/25/1952 10:15	5/27/1952 13:30	51:15:00	LPRSA0189740	PAP-00456135	
5/29/1952 16:15	6/14/1952 10:30	378:15:00	LPRSA0189736	PAP-00456131	
6/17/1952 18:15	6/18/1952 14:30	20:15:00	LPRSA0189735	PAP-00456130	
6/19/1952 14:15	6/20/1952 9:00	18:45:00	LPRSA0189734	PAP-00456129	
6/27/1952 16:40	6/28/1952 9:30	16:50:00	LPRSA0189729	PAP-00456124	
6/29/1952 2:00	6/30/1952 10:50	32:50:00	LPRSA0189728	PAP-00456123	
7/8/1952 17:00	7/10/1952 16:15	47:15:00	LPRSA0189730	PAP-00456125	
7/21/1952 17:15	7/22/1952 13:30	20:15:00	LPRSA0189726	PAP-00456121	
7/31/1952 17:25	8/1/1952 10:25	17:00:00	LPRSA0189724	PAP-00456119	
8/2/1952 17:00	8/3/1952 10:15	17:15:00	LPRSA0189725	PAP-00456120	
8/6/1952 16:00	8/11/1952 10:00	114:00:00	LPRSA0189715	PAP-00456110, 113	
8/12/1952 18:00			LPRSA0189721	PAP-00456116	data missing
8/15/1952 17:45	8/17/1952 9:45	40:00:00	LPRSA0189714	PAP-00456109	
8/21/1952 17:15	8/22/1952 13:30	20:15:00	LPRSA0189713	PAP-00456108	
8/30/1952 10:45	9/2/1952 9:45	71:00:00	LPRSA0189712	PAP-00456107	
9/2/1952 17:45	9/4/1952 9:30	39:45:00	LPRSA0189711	PAP-00456106	
9/15/1952 17:15	9/17/1952 17:45	48:30:00	LPRSA0189709	PAP-00456104	
9/18/1952 13:45	9/20/1952 9:45	44:00:00	LPRSA0189710	PAP-00456105	
9/23/1952 11:15	9/24/1952 10:00	22:45:00	LPRSA0189708	PAP-00456103	
10/2/1952 19:45	10/3/1952 14:15	18:30:00	LPRSA0189707	PAP-00456102	
10/28/1952 18:15	10/29/1952 9:45	15:30:00	LPRSA0189706	PAP-00456101	
11/3/1952 14:45	11/4/1952 9:45	19:00:00	LPRSA0189703	PAP-00456098	
11/10/1952 17:15	11/11/1952 9:45	16:30:00	LPRSA0189704	PAP-00456099	
11/14/1952 14:15	12/1/1952 14:15	408:00:00	LPRSA0189701	PAP-00456096	
12/2/1952 14:45	12/8/1952 9:30	138:45:00	LPRSA0189702	PAP-00456097	
12/9/1952 8:45	1/18/1953 15:15	966:30:00	LPRSA0189655	PAP-00456556	
1/21/1953 15:45	1/22/1953 13:30	21:45:00	LPRSA0189656	PAP-00456557	
1/24/1953 10:45	1/25/1953 10:30	23:45:00	LPRSA0189657	PAP-00456558	
2/11/1953 18:00	2/13/1953 11:00	41:00:00	LPRSA0189658	PAP-00456559	
2/15/1953 11:45	2/16/1953 14:30	26:45:00	LPRSA0189659	PAP-00456560	
2/25/1953 9:45	3/11/1953 10:00	336:15:00	LPRSA0189661	PAP-00456562	
	3/14/1953 13:15		LPRSA0189670	PAP-00456161	data missing
3/17/1953 15:15	4/28/1953 13:30	1006:15:00	LPRSA0189670	PAP-00456161	
4/29/1953 9:30	4/29/1953 15:30	6:00:00	LPRSA0189670	PAP-00456161	

4/30/1953 17:45	5/8/1953 16:00	190:15:00	LPRSA0189670	PAP-00456161	
5/8/1953 11:30			LPRSA0189670	PAP-00456161	data missing
6/13/1953 18:00	6/15/1953 11:15	41:15:00	LPRSA0189674	PAP-00456563	
6/22/1953 11:00	7/2/1953 15:00	244:00:00	LPRSA0189677	PAP-00456566	
7/6/1953 21:00	7/7/1953 9:30	12:30:00	LPRSA0189681	PAP-00456570	
7/20/1953 22:00	7/21/1953 9:35	11:35:00	LPRSA0189682	PAP-00456571	
7/21/1953 16:45	7/22/1953 9:15	16:30:00	LPRSA0189683	PAP-00456572	
7/23/1953 9:25	7/24/1953 13:30	28:05:00	LPRSA0189684	PAP-00456573	
8/14/1953 14:15	8/15/1953 9:30	19:15:00	LPRSA0189686	PAP-00456575	
10/6/1953 19:30	10/7/1953 10:30	15:00:00	LPRSA0189689	PAP-00456578	
10/20/1953 9:15	10/29/1953 17:30	224:15:00	LPRSA0189690	PAP-00456579	
11/7/1953 8:15	11/8/1953 11:45	27:30:00	LPRSA0189695	PAP-00456584	
11/16/1953 10:45			LPRSA0189653	PAP-00456554	data missing
11/23/1953 11:00	11/23/1953 15:15	4:15:00	LPRSA0189698	PAP-00456587	
11/25/1953 13:15	11/26/1953 10:00	20:45:00	LPRSA0189652	PAP-00456553	
11/30/1953 11:00	12/5/1953 8:45	117:45:00	LPRSA0189651	PAP-00456552	
12/6/1953 10:30	12/8/1953 10:00	47:30:00	LPRSA0189650	PAP-00456551	
12/9/1953 17:30	12/11/1953 10:00	40:30:00	LPRSA0189649	PAP-00456550	
12/14/1953 7:15	12/15/1953 13:45	30:30:00	LPRSA0189647	PAP-00456548	
1/15/1954 14:00	1/18/1954 10:45	68:45:00	LPRSA0189592	PAP-00456493	
1/20/1954 15:00	1/22/1954 13:30	46:30:00	LPRSA0189591	PAP-00456492	
1/25/1954 4:00	2/2/1954 14:00	202:00:00	LPRSA0189590	PAP-00456491	
2/3/1954 14:30	2/4/1954 10:30	20:00:00	LPRSA0189589	PAP-00456490	
2/15/1954 15:00	2/19/1954 14:15	95:15:00	LPRSA0189587	PAP-00456488	
2/21/1954 18:15	2/22/1954 9:45	15:30:00	LPRSA0189586	PAP-00456487	
2/23/1954 13:00	2/27/1954 9:45	92:45:00	LPRSA0189621	PAP-00456522	
3/1/1954 12:00	3/5/1954 14:45	98:45:00	LPRSA0189619	PAP-00456520	
3/13/1954 16:00	3/15/1954 10:30	42:30:00	LPRSA0189618	PAP-00456519	
3/19/1954 17:30	3/20/1954 13:40	20:10:00	LPRSA0189617	PAP-00456518	
3/25/1954 11:00	3/26/1954 10:45	23:45:00	LPRSA0189616	PAP-00456517	
4/8/1954 14:45	4/9/1954 10:30	19:45:00	LPRSA0189613	PAP-00456514	
4/13/1954 13:30	4/13/1954 15:00	1:30:00	LPRSA0189623	PAP-00456524	
4/16/1954 13:50	4/18/1954 10:50	45:00:00	LPRSA0189632	PAP-00456533	
4/19/1954 16:45	4/21/1954 15:30	46:45:00	LPRSA0189615	PAP-00456516	
4/23/1954 14:30	4/25/1954 10:30	44:00:00	LPRSA0189614	PAP-00456515	
4/28/1954 16:15	4/29/1954 10:30	18:15:00	LPRSA0189612	PAP-00456513	
5/3/1954 11:45	5/26/1954 9:45	550:00:00	LPRSA0189631	PAP-00456532	
6/1/1954 12:45	6/3/1954 16:30	51:45:00	LPRSA0189630	PAP-00456531	
7/2/1954 10:00	7/2/1954 17:00	7:00:00	LPRSA0189626	PAP-00456527	
7/4/1954 13:15	7/4/1954 14:30	1:15:00	LPRSA0189625	PAP-00456526	
9/10/1954 14:45	9/12/1954 10:30	43:45:00	LPRSA0189606	PAP-00456507	
5/16/1957 0:00	8/25/1957 23:59				data missing
9/18/1957 0:00	12/19/1957 23:59				data missing
9/12/1960 12:20	9/13/1960 9:30	21:10:00	LPRSA0189397	PAP-00456240	
1/1/1963 0:00	12/31/1974 23:59				data missing
Subtotal 1950-1962 Koch Report		8676:55:00			

Subtotal 1950-1962 Throw out Logs		8695:55:00			
Koch report (1974-1975) PAP-00488455					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers		
1/1/1975	1/1/1975	0:00:00	LPRSA0197075	PAP-00456754	
7/20/1975	7/20/1975	0:00:00	LPRSA0197076	PAP-00456755	
7/21/1975	12/31/2004				data missing
Subtotal 1974-1975 Koch Report		0:00:00			

Source: Elson T. Killam Associates, Inc., Report Upon Overflow Analysis, Newark Area, prepared for PVSC, 1976.

Exhibit 1j. Documented PVSC Bypasses at Polk Street
(Newark)

Allocation Report			
	Time of bypasses	Time observed	% of Total Time
1950-1962	13170:00:00	106740:30:00	12.34%
1974-1975	477:55:00	8329:00:00	5.74%
Total	13647:55:00	115069:30:00	11.86%

Koch report 1950-1962 (PAP-00488463 - PAP-00488467)					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates Number (throw-out logs)	Comments
10/4/1950 22:00	10/5/1950 11:30	13:30:00	LPRSA0188654	PAP-00456399	
10/10/1950 2:30	10/10/1950 13:00	10:30:00	LPRSA0188652	PAP-00456397	
10/12/1950 13:30	10/13/1950 11:00	21:30:00	LPRSA0188650	PAP-00456395	
10/23/1950 13:30	10/24/1950 9:00	19:30:00	LPRSA0188648	PAP-00456393	
11/20/1950 18:00	11/21/1950 9:00	15:00:00	LPRSA0188646	PAP-00456391	
11/25/1950 9:00	11/25/1950 13:00	4:00:00	LPRSA0188643	PAP-00456388	
12/4/1950 12:30	12/5/1950 9:30	21:00:00	LPRSA0188641	PAP-00456386	
12/7/1950 16:00	12/8/1950 11:30	19:30:00	LPRSA0188637	PAP-00456382	
12/15/1950 22:30	12/16/1950 14:30	16:00:00	LPRSA0188639	PAP-00456384	
12/29/1950 12:30	12/30/1950 11:30	23:00:00	LPRSA0188635	PAP-00456380	
1/7/1951 17:00	1/8/1951 9:00	16:00:00	LPRSA0188633	PAP-00456378	
1/11/1951 17:30	1/12/1951 8:30	15:00:00	LPRSA0188621	PAP-00456364	
1/14/1951 18:00	1/15/1951 12:00	18:00:00	LPRSA0188623	PAP-00456376	
1/23/1951 2:00	1/24/1951 14:00	36:00:00	LPRSA0188625	PAP-00456366	
1/25/1951 16:00	1/26/1951 10:00	18:00:00	LPRSA0188623	PAP-00456368	
1/28/1951 17:00	1/30/1951 10:00	41:00:00	LPRSA0188625	PAP-00456370	
1/31/1951 16:00	2/2/1951 10:00	42:00:00	LPRSA0188628	PAP-00456373	
2/10/1951 5:30	2/10/1951 14:30	9:00:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/11/1951 18:00	2/15/1951 14:30	92:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/17/1951 4:00	2/18/1951 11:30	31:30:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/19/1951 17:00	2/20/1951 14:30	21:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
2/23/1951 8:30	2/23/1951 10:00	1:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
3/1/1951 13:00	3/2/1951 10:00	21:00:00	LPRSA0188604	PAP-00456349	
3/3/1951 15:00	3/5/1951 10:30	43:30:00	LPRSA0188606	PAP-00456351	

3/13/1951 16:30	3/15/1951 9:30	41:00:00	LPRSA0188609	PAP-00456354	
3/16/1951 16:00	3/19/1951 9:30	65:30:00	LPRSA0188612	PAP-00456357	
3/19/1951 17:00	3/21/1951 9:00	40:00:00	LPRSA0188616	PAP-00456361	
3/22/1951 0:00	12/31/1951 23:59				data missing
2/17/1952 3:30	2/19/1952 11:00	55:30:00	LPRSA0189755	PAP-00456150	
2/20/1952 18:00	2/22/1952 10:30	40:30:00	LPRSA0189754	PAP-00456149	
2/29/1952 21:00	3/7/1952 10:30	157:30:00	LPRSA0189753	PAP-00456148	
3/11/1952 5:00	3/18/1952 10:30	173:30:00	LPRSA0189752	PAP-00456147	
3/19/1952 10:30	3/21/1952 11:00	48:30:00	LPRSA0189751	PAP-00456146	
3/22/1952 17:00	3/26/1952 11:00	90:00:00	LPRSA0189750	PAP-00456145	
4/5/1952 8:00	4/7/1952 11:00	51:00:00	LPRSA0189749	PAP-00456144	
4/14/1952 4:00	4/17/1952 11:00	79:00:00	LPRSA0189748	PAP-00456143	
4/25/1952 11:00	5/9/1952 16:30	341:30:00	LPRSA0189744	PAP-00456139, 141	
5/11/1952 22:00	5/14/1952 14:30	64:30:00	LPRSA0189743	PAP-00456138	
5/18/1952 9:15	5/23/1952 15:50	126:35:00	LPRSA0189741	PAP-00456136	
5/25/1952 10:45	5/27/1952 14:00	51:15:00	LPRSA0189740	PAP-00456135	
5/29/1952 17:15	6/14/1952 11:00	377:45:00	LPRSA0189736	PAP-00456131	
6/17/1952 18:45	6/18/1952 15:15	20:30:00	LPRSA0189735	PAP-00456130	
6/19/1952 13:45	6/20/1952 8:35	18:50:00	LPRSA0189734	PAP-00456129	
6/27/1952 17:00	6/28/1952 10:00	17:00:00	LPRSA0189729	PAP-00456124	
6/29/1952 2:50	6/30/1952 11:15	32:25:00	LPRSA0189728	PAP-00456123	
7/8/1952 17:30	7/10/1952 15:45	46:15:00	LPRSA0189730	PAP-00456125	
7/21/1952 17:45	7/22/1952 14:00	20:15:00	LPRSA0189726	PAP-00456121	
7/31/1952 17:40	8/1/1952 10:40	17:00:00	LPRSA0189724	PAP-00456119	
8/2/1952 17:20	8/3/1952 10:45	17:25:00	LPRSA0189725	PAP-00456120	
8/6/1952 16:30	8/11/1952 10:30	114:00:00	LPRSA0189715	PAP-00456110, 113	
8/12/1952 18:30	8/14/1952 10:00	39:30:00	LPRSA0189721	PAP-00456116, 118	
8/15/1952 18:15	8/17/1952 10:15	40:00:00	LPRSA0189714	PAP-00456109	
8/21/1952 17:45	8/22/1952 14:00	20:15:00	LPRSA0189713	PAP-00456108	
8/30/1952 11:15	9/2/1952 10:15	71:00:00	LPRSA0189712	PAP-00456107	
9/2/1952 18:15	9/4/1952 10:00	39:45:00	LPRSA0189711	PAP-00456106	
9/15/1952 17:45	9/17/1952 18:15	48:30:00	LPRSA0189709	PAP-00456104	
9/18/1952 14:15	9/20/1952 10:15	44:00:00	LPRSA0189710	PAP-00456105	
9/23/1952 11:45	9/24/1952 10:30	22:45:00	LPRSA0189708	PAP-00456103	
10/2/1952 20:15	10/3/1952 14:45	18:30:00	LPRSA0189707	PAP-00456102	
10/28/1952 18:45	10/29/1952 10:15	15:30:00	LPRSA0189706	PAP-00456101	
11/3/1952 15:15	11/4/1952 10:15	19:00:00	LPRSA0189703	PAP-00456098	
11/10/1952 17:45	11/11/1952 10:15	16:30:00	LPRSA0189704	PAP-00456099	
11/14/1952 14:45	12/1/1952 14:45	408:00:00	LPRSA0189701	PAP-00456096	
12/2/1952 15:15	12/8/1952 10:00	138:45:00	LPRSA0189702	PAP-00456097	
12/9/1952 9:15	1/18/1953 15:45	966:30:00	LPRSA0189655	PAP-00456556	
1/21/1953 16:15	1/22/1953 14:00	21:45:00	LPRSA0189656	PAP-00456557	
1/24/1953 11:15	1/25/1953 11:00	23:45:00	LPRSA0189657	PAP-00456558	
2/11/1953 18:30	2/13/1953 11:30	41:00:00	LPRSA0189658	PAP-00456559	
2/15/1953 12:15	2/16/1953 15:00	26:45:00	LPRSA0189659	PAP-00456560	
2/25/1953 10:15	3/11/1953 10:30	336:15:00	LPRSA0189661	PAP-00456562	
	3/14/1953 14:00		LPRSA0189672	PAP-00456731	data missing

3/17/1953 15:45	4/29/1953 11:30	1027:45:00	LPRSA0189672	PAP-00456731	
4/30/1953 18:15	5/8/1953 16:30	190:15:00	LPRSA0189672	PAP-00456731	
5/8/1953 10:45			LPRSA0189672	PAP-00456731	data missing
6/13/1953 18:30	6/15/1953 11:45	41:15:00	LPRSA0189674	PAP-00456563	
6/22/1953 11:30	7/2/1953 15:30	244:00:00	LPRSA0189677	PAP-00456566	
7/6/1953 21:30	7/7/1953 10:00	12:30:00	LPRSA0189681	PAP-00456570	
7/20/1953 22:30	7/21/1953 10:15	11:45:00	LPRSA0189682	PAP-00456571	
7/21/1953 17:30	7/22/1953 9:45	16:15:00	LPRSA0189683	PAP-00456572	
7/23/1953 9:45	7/24/1953 14:00	28:15:00	LPRSA0189684	PAP-00456573	
8/14/1953 14:45	8/15/1953 10:00	19:15:00	LPRSA0189686	PAP-00456575	
10/20/1953 9:45	10/29/1953 18:00	224:15:00	LPRSA0189690	PAP-00456579	
11/7/1953 8:45	11/8/1953 12:15	27:30:00	LPRSA0189695	PAP-00456584	
11/16/1953 11:15			LPRSA0189653	PAP-00456554	data missing
11/23/1953 11:30	11/23/1953 14:45	3:15:00	LPRSA0189698	PAP-00456587	
11/25/1953 13:45	11/26/1953 10:30	20:45:00	LPRSA0189652	PAP-00456553	
11/30/1953 11:30	12/5/1953 9:15	117:45:00	LPRSA0189651	PAP-00456552	
12/6/1953 11:00	12/8/1953 10:30	47:30:00	LPRSA0189650	PAP-00456551	
12/9/1953 18:00	12/11/1953 10:30	40:30:00	LPRSA0189649	PAP-00456550	
12/14/1953 7:45	12/15/1953 14:15	30:30:00	LPRSA0189647	PAP-00456548	
1/15/1954 14:30	1/18/1954 11:15	68:45:00	LPRSA0189592	PAP-00456493	
1/20/1954 15:30	1/22/1954 14:00	46:30:00	LPRSA0189591	PAP-00456492	
1/25/1954 4:30	2/2/1954 14:30	202:00:00	LPRSA0189590	PAP-00456491	
2/3/1954 15:00	2/4/1954 11:00	20:00:00	LPRSA0189589	PAP-00456490	
2/15/1954 15:30	2/19/1954 14:45	95:15:00	LPRSA0189587	PAP-00456488	
2/21/1954 18:45	2/22/1954 10:15	15:30:00	LPRSA0189586	PAP-00456487	
2/23/1954 13:30	2/27/1954 10:15	92:45:00	LPRSA0189621	PAP-00456522	
3/1/1954 12:30	3/5/1954 15:15	98:45:00	LPRSA0189619	PAP-00456520	
3/13/1954 16:30	3/15/1954 11:00	42:30:00	LPRSA0189618	PAP-00456519	
3/19/1954 18:00	3/20/1954 13:10	19:10:00	LPRSA0189617	PAP-00456518	
3/25/1954 11:30	3/26/1954 11:15	23:45:00	LPRSA0189616	PAP-00456517	
4/8/1954 15:15	4/9/1954 11:00	19:45:00	LPRSA0189613	PAP-00456514	
4/13/1954 14:00	4/13/1954 14:40	0:40:00	LPRSA0189623	PAP-00456524	
4/16/1954 14:10	4/18/1954 11:10	45:00:00	LPRSA0189632	PAP-00456533	
4/19/1954 17:15	4/21/1954 15:00	45:45:00	LPRSA0189615	PAP-00456516	
4/23/1954 15:00	4/25/1954 11:00	44:00:00	LPRSA0189614	PAP-00456515	
4/28/1954 16:45	4/29/1954 11:00	18:15:00	LPRSA0189612	PAP-00456513	
5/3/1954 12:15	5/26/1954 10:15	550:00:00	LPRSA0189631	PAP-00456532	
6/1/1954 13:15	6/9/1954 11:30	190:15:00	LPRSA0189630	PAP-00456531	
6/10/1954 14:15	6/11/1954 10:30	20:15:00	LPRSA0189629	PAP-00456530	
7/2/1954 10:30	7/2/1954 17:30	7:00:00	LPRSA0189626	PAP-00456527	
7/4/1954 13:45	7/5/1954 10:15	20:30:00	LPRSA0189625	PAP-00456526	
7/7/1954 18:00	7/8/1954 14:15	20:15:00	LPRSA0189624	PAP-00456525	
7/14/1954 17:45	7/15/1954 13:15	19:30:00	LPRSA0189634	PAP-00456535	
7/22/1954 16:45	7/23/1954 10:15	17:30:00	LPRSA0189633	PAP-00456534	
8/3/1954 10:45	8/4/1954 10:45	24:00:00	LPRSA0189620	PAP-00456521	
8/9/1954 10:30	8/11/1954 11:00	48:30:00	LPRSA0189622	PAP-00456523	
8/19/1954 0:15	8/20/1954 11:30	35:15:00	LPRSA0189611	PAP-00456512	

8/20/1954 20:00	8/22/1954 10:00	38:00:00	LPRSA0189610	PAP-00456511	
8/25/1954 18:15	8/26/1954 14:15	20:00:00	LPRSA0189609	PAP-00456510	
9/8/1954 16:00	9/9/1954 14:15	22:15:00	LPRSA0189607	PAP-00456508	
9/10/1954 15:15	9/12/1954 11:00	43:45:00	LPRSA0189606	PAP-00456507	
10/7/1954 10:30	10/8/1954 14:45	28:15:00	LPRSA0189604	PAP-00456505	
10/15/1954 12:45	10/16/1954 8:15	19:30:00	LPRSA0189603	PAP-00456504	
10/27/1954 18:00	10/28/1954 2:15	8:15:00	LPRSA0189602	PAP-00456503	
10/29/1954 11:00	10/30/1954 10:30	23:30:00	LPRSA0189601	PAP-00456502	
11/2/1954 14:30	11/5/1954 15:30	73:00:00	LPRSA0189600	PAP-00456501	
11/8/1954 14:45	11/9/1954 14:45	24:00:00	LPRSA0189599	PAP-00456500	
11/15/1954 11:15	12/2/1954 4:00	400:45:00	LPRSA0189597	PAP-00456498	
12/9/1954 15:30	12/10/1954 14:45	23:15:00	LPRSA0189596	PAP-00456497	
12/14/1954 11:00	12/15/1954 14:30	27:30:00	LPRSA0189595	PAP-00456496	
12/18/1954 11:45	12/19/1954 9:45	22:00:00	LPRSA0189593	PAP-00456494	
12/29/1954 14:30	12/30/1954 13:15	22:45:00	LPRSA0189585	PAP-00456486	
1/6/1955 15:30	1/7/1955 10:45	19:15:00	LPRSA0189582	PAP-00456485	
1/28/1955 11:15	3/9/1955 11:15	960:00:00	LPRSA0189580	PAP-00456483	
4/6/1955 15:45	4/7/1955 10:00	18:15:00	LPRSA0189575	PAP-00456478	
4/12/1955 16:00	4/15/1955 10:30	66:30:00	LPRSA0189574	PAP-00456477	
5/31/1955 15:00	5/31/1955 17:15	2:15:00	LPRSA0189572	PAP-00456475	
6/22/1955 0:45	6/22/1955 10:00	9:15:00	LPRSA0189571	PAP-00456474	
8/8/1955 1:15	8/8/1955 9:45	8:30:00	LPRSA0189570	PAP-00456473	
8/19/1955 1:00	8/20/1955 4:45	27:45:00	LPRSA0189567	PAP-00456470	
8/22/1955 23:30	8/24/1955 14:15	38:45:00	LPRSA0189566	PAP-00456469	
9/24/1955 8:15	9/26/1955 10:00	49:45:00	LPRSA0189563	PAP-00456466	
10/6/1955 10:00	10/7/1955 14:45	28:45:00	LPRSA0189562	PAP-00456465	
10/14/1955 10:45	10/25/1955 14:15	267:30:00	LPRSA0189561	PAP-00456464	
10/30/1955 11:30	11/1/1955 15:00	51:30:00	LPRSA0189560	PAP-00456463	
11/10/1955 17:30	11/12/1955 10:15	40:45:00	LPRSA0189559	PAP-00456462	
11/16/1955 11:00	11/18/1955 11:15	48:15:00	LPRSA0189558	PAP-00456461	
1/30/1956 15:00	1/31/1956 10:00	19:00:00	LPRSA0189556	PAP-00456460	
2/2/1956 13:30	2/3/1956 10:00	20:30:00	LPRSA0189555	PAP-00456459	
2/6/1956 17:15	2/7/1956 14:00	20:45:00	LPRSA0189554	PAP-00456458	
2/18/1956 10:00	2/19/1956 9:30	23:30:00	LPRSA0189553	PAP-00456457	
3/8/1956 3:15	3/9/1956 10:00	30:45:00	LPRSA0189552	PAP-00456456	
3/14/1956 10:15	3/15/1956 10:00	23:45:00	LPRSA0189551	PAP-00456455	
3/21/1956 17:45	3/23/1956 10:15	40:30:00	LPRSA0189549	PAP-00456453	
4/11/1956 15:15	4/12/1956 9:25	18:10:00	LPRSA0189545	PAP-00456449	
5/2/1956 22:15	5/3/1956 10:00	11:45:00	LPRSA0189544	PAP-00456448	
6/2/1956 16:10	6/4/1956 10:45	42:35:00	LPRSA0189543	PAP-00456447	
6/27/1956 15:45	6/27/1956 18:50	3:05:00	LPRSA0189542	PAP-00456446	
7/16/1956 15:15	7/17/1956 9:45	18:30:00	LPRSA0189541	PAP-00456445	
7/21/1956 10:30	7/21/1956 22:35	12:05:00	LPRSA0189540	PAP-00456444	
7/27/1956 11:15	7/28/1956 8:50	21:35:00	LPRSA0189539	PAP-00456443	
8/6/1956 17:15	8/7/1956 9:00	15:45:00	LPRSA0189538	PAP-00456442	
8/21/1956 5:30	8/22/1956 8:50	27:20:00	LPRSA0189537	PAP-00456441	
9/6/1956 19:45	9/7/1956 9:15	13:30:00	LPRSA0189536	PAP-00456440	

9/7/1956 11:30	9/8/1956 11:45	24:15:00	LPRSA0189535	PAP-00456439	
9/27/1956 16:45	9/28/1956 9:00	16:15:00	LPRSA0189534	PAP-00456438	
10/22/1956 23:15	10/23/1956 9:45	10:30:00	LPRSA0189533	PAP-00456437	
10/31/1956 12:30	11/4/1956 13:00	96:30:00	LPRSA0189532	PAP-00456436	
11/18/1956 3:00	11/18/1956 11:45	8:45:00	LPRSA0189531	PAP-00456435	
11/22/1956 1:15	11/22/1956 8:45	7:30:00	LPRSA0189530	PAP-00456434	
12/9/1956 15:45	12/10/1956 9:15	17:30:00	LPRSA0189529	PAP-00456433	
12/14/1956 9:00	12/17/1956 8:30	71:30:00	LPRSA0189528	PAP-00456432	
12/22/1956 23:00	12/23/1956 10:45	11:45:00	LPRSA0189527	PAP-00456431	
1/23/1957 4:30	1/23/1957 14:45	10:15:00	LPRSA0189498	PAP-00456403	
2/9/1957 14:45	2/10/1957 9:30	18:45:00	LPRSA0189497	PAP-00456402	
2/26/1957 16:30	2/27/1957 13:30	21:00:00	LPRSA0189496	PAP-00456401	
3/1/1957 17:15	3/2/1957 23:15	30:00:00	LPRSA0189524	PAP-00456429	
3/8/1957 10:15	3/10/1957 10:20	48:05:00	LPRSA0189523	PAP-00456428	
3/19/1957 22:15	3/21/1957 9:30	35:15:00	LPRSA0189521	PAP-00456426	
4/2/1957 8:30	4/2/1957 14:45	6:15:00	LPRSA0189520	PAP-00456425	
4/9/1957 10:00	4/9/1957 16:45	6:45:00	LPRSA0189516	PAP-00456421	
4/10/1957 10:00	4/10/1957 16:45	6:45:00	LPRSA0189515	PAP-00456420	
4/11/1957 9:15	4/11/1957 16:45	7:30:00	LPRSA0189514	PAP-00456419	
4/12/1957 9:15	4/12/1957 17:00	7:45:00	LPRSA0189513	PAP-00456418	
4/23/1957 7:45	4/23/1957 14:45	7:00:00	LPRSA0189511	PAP-00456416	
5/14/1957 21:45	5/15/1957 11:30	13:45:00	LPRSA0189508	PAP-00456413	
5/16/1957 0:00	8/25/1957 23:59				data missing
9/18/1957 0:00	12/19/1957 23:59				data missing
2/28/1958 4:15	2/28/1958 9:45	5:30:00	LPRSA0189488	PAP-00456189	
4/28/1958 9:30	4/28/1958 14:30	5:00:00	LPRSA0189480	PAP-00456181	
4/29/1958 20:15	4/30/1958 9:15	13:00:00	LPRSA0189479	PAP-00456180	
10/23/1958 3:15	10/24/1958 10:00	30:45:00	LPRSA0189469	PAP-00456170	
11/28/1958 21:15	11/29/1958 11:15	14:00:00	LPRSA0189466	PAP-00456167	
3/6/1959 8:30	3/7/1959 9:45	25:15:00	LPRSA0189458	PAP-00456227	
6/2/1959 19:00	6/3/1959 8:45	13:45:00	LPRSA0189454	PAP-00456223	
9/1/1959 19:50	9/3/1959 10:30	38:40:00	LPRSA0189445	PAP-00456214	
12/7/1959 2:00	12/7/1959 9:30	7:30:00	LPRSA0189431	PAP-00456200	
2/19/1960 1:20	2/19/1960 13:40	12:20:00	LPRSA0189421	PAP-00456264	
2/26/1960 3:00	2/26/1960 11:10	8:10:00	LPRSA0189420	PAP-00456263	
7/14/1960 14:30	7/15/1960 9:00	18:30:00	LPRSA0189404	PAP-00456247	
7/30/1960 10:50	7/31/1960 10:20	23:30:00	LPRSA0189402	PAP-00456245	
8/19/1960 9:50	8/20/1960 10:00	24:10:00	LPRSA0189399	PAP-00456242	
9/12/1960 9:00	9/13/1960 11:00	26:00:00	LPRSA0189397	PAP-00456240	
12/21/1960 10:30	12/22/1960 10:25	23:55:00	LPRSA0189391	PAP-00456234	
3/14/1961 9:30	3/14/1961 13:45	4:15:00	LPRSA0189382	PAP-00456723	
3/23/1961 14:20	3/24/1961 11:35	21:15:00	LPRSA0189383	PAP-00456724	
4/10/1961 12:10	4/11/1961 9:20	21:10:00	LPRSA0189376	PAP-00456717	
4/13/1961 11:10	4/14/1961 9:30	22:20:00	LPRSA0189375	PAP-00456716	
4/16/1961 14:00	4/17/1961 10:15	20:15:00	LPRSA0189373	PAP-00456714	
4/25/1961 20:00	4/26/1961 9:20	13:20:00	LPRSA0189369	PAP-00456710	
7/20/1961 13:25	7/21/1961 9:55	20:30:00	LPRSA0189357	PAP-00456698	

9/19/1961 15:35	9/22/1961 21:45	78:10:00	LPRSA0189348	PAP-00456689	
12/18/1961 11:45	12/20/1961 11:00	47:15:00	LPRSA0189338	PAP-00456679	
2/26/1962 13:55	2/27/1962 9:30	19:35:00	LPRSA0189329	PAP-00456321	
2/27/1962 14:35	3/1/1962 9:45	43:10:00	LPRSA0189329	PAP-00456321	
3/12/1962 9:25	3/13/1962 15:45	30:20:00	LPRSA0189327	PAP-00456319	
9/5/1962 14:00	9/6/1962 9:25	19:25:00	LPRSA0189301	PAP-00456293	
9/27/1962 13:05	9/28/1962 14:30	25:25:00	LPRSA0189296	PAP-00456288	
10/5/1962 8:45	10/6/1962 10:25	25:40:00	LPRSA0189295	PAP-00456287	
11/3/1962 11:10	11/5/1962 10:20	47:10:00	LPRSA0189288	PAP-00456280	
11/9/1962 15:50	11/11/1962 11:25	43:35:00	LPRSA0189287	PAP-00456279	
11/21/1962 23:30	11/23/1962 10:30	35:00:00	LPRSA0189284	PAP-00456276	
12/5/1962 10:35	12/8/1962 10:30	71:55:00	LPRSA0189283	PAP-00456275	
1/1/1963 0:00	9/30/1974 23:59				data missing
Subtotal 1950-1962 Koch Report		13170:00:00			
Subtotal 1950-1962 Throw out Logs		13170:00:00			

Koch report (1974-1975) PAP-00488468					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates Number (throw-out logs)	
10/16/1974 10:00	10/17/1974 22:00	36:00:00	LPRSA0195712	PAP-00456733	
12/2/1974 6:00	12/3/1974 9:00	27:00:00	LPRSA0195714	PAP-00456734	
12/8/1974 14:00	12/9/1974 9:00	19:00:00	LPRSA0195714	PAP-00456734	
12/16/74 13:00	12/17/74 9:00	20:00:00	LPRSA0195714	PAP-00456734	
1/13/1975 11:00	1/14/1975 9:00	22:00:00	LPRSA0195715	PAP-00456735	
1/18/1975 16:00	1/19/1975 7:00	15:00:00	LPRSA0195715	PAP-00456735	
1/29/1975 7:00	1/29/1975 11:00	4:00:00	LPRSA0195715	PAP-00456735	
2/23/1975 0:00	2/23/1975 0:00	0:00:00	LPRSA0197152	PAP-00456757	
3/12/1975	3/12/1975	3:15:00	LPRSA0197152	PAP-00456757	
3/19/1975 18:00	3/20/1975 9:00	15:00:00	LPRSA0195717	PAP-00456737	
4/3/1975 10:00	4/4/1975 0.00	14:00:00	LPRSA0195718	PAP-00456738	
4/24/1975 0:00	4/25/1975 0:00	0:40:00	LPRSA0197152	PAP-00456757	
6/6/1975 1:00	6/6/1975 8:00	7:00:00	LPRSA0195720	PAP-00456740	
6/6/1975 16:00	6/7/1975 2:00	10:00:00	LPRSA0195720	PAP-00456740	Entry in Koch report was corrected. The throw out log shows start bypass at 4:00 PM
6/12/1975 10:00	6/13/1975 15:00	29:00:00	LPRSA0195720	PAP-00456740	
7/4/1975 5:00	7/4/1975 13:00	8:00:00	LPRSA0195721	PAP-00456741	
7/7/1975 9:00	7/7/1975 22:00	13:00:00	LPRSA0195721	PAP-00456741	
7/9/1975 19:00	7/10/1975 3:00	8:00:00	LPRSA0195721	PAP-00456741	
7/13/1975 14:00	7/14/1975 9:00	19:00:00	LPRSA0195721	PAP-00456741	
7/14/1975 11:00	7/17/1975 8:00	69:00:00	LPRSA0195721	PAP-00456741	
7/25/1975 3:00	7/25/1975 14:00	11:00:00	LPRSA0195721	PAP-00456741	
8/6/1975 0:00	8/7/1975 0:00	0:00:00	LPRSA0197153	PAP-00456758	
9/23/1975 3:00	9/28/1975 11:00	128:00:00	LPRSA0195722	PAP-00456742	
10/1/1975	12/31/2004				missing data
Subtotal 1974-1975 Koch Report		479:55:00			
Subtotal 1974-1975 Throw out Logs		477:55:00			

bypass hours per Koch Table 2-2 in Exhibit 2 of her report (pdf page 58)

Exhibit 1I. Documented PVSC Bypasses at Yantacaw
(Paterson, Passaic, Clifton, Garfield, and upstream of 3rd River)

Allocation Report			
	Time of bypasses	Time observed	% of Total Time
1950-1962	2465:40:00	106063:15:00	2.32%
1974-1975	0:00:00	0:00:00	0.00%
Total	2465:40:00	106063:15:00	2.32%

Koch report 1950-1962 (PAP-00488477 - PAP-00488479)					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates Number (throw-out logs)	Comments
10/5/1950 2:00	10/5/1950 11:30	9:30:00	LPRSA0188654	PAP-00456399	
11/25/1950 13:00	11/26/1950 9:30	20:30:00	LPRSA0188643	PAP-00456388	
12/4/1950 20:30	12/5/1950 8:30	12:00:00	LPRSA0188641	PAP-00456386	
12/8/1950 2:00	12/8/1950 9:00	7:00:00	LPRSA0188637	PAP-00456382	
12/29/1950 12:30	12/30/1950 11:30	23:00:00	LPRSA0188635	PAP-00456380	
1/14/1951 21:00	1/15/1951 9:00	12:00:00	LPRSA0188631	PAP-00456376	
1/23/1951 4:00	1/24/1951 8:00	28:00:00	LPRSA0188621	LPRSA0188622	
2/1/1951 15:00	2/2/1951 8:00	17:00:00	LPRSA0188628	PAP-00456373	
2/7/1951 17:00	2/8/1951 8:30	15:30:00	LPRSA0188585	PAP-00456085; PAP-00456330	Start time corrected to match throw out log
2/17/1951 21:30	2/18/1951 9:30	12:00:00	LPRSA0188588	PAP-00456088; PAP-00456333	
2/21/1951 9:30	2/22/1951 9:00	23:30:00	LPRSA0188596	PAP-00456064; PAP-00456341	
3/14/1951 11:00	3/14/1951 13:30	2:30:00	LPRSA0188609	PAP-00456354	
3/20/1951 5:30	3/20/1951 9:00	3:30:00	LPRSA0188616	PAP-00456361	
3/22/1951 0:00	12/31/1951 23:59				missing data
3/11/1952 9:30	3/12/1952 9:30	24:00:00	LPRSA0189752	PAP-00456147	
3/19/1952 15:15	3/20/1952 9:00	17:45:00	LPRSA0189751	PAP-00456146	
4/25/1952 18:00	4/26/1952 9:00	15:00:00	LPRSA0189744	PAP-00456139	
4/28/1952 9:30	4/29/1952 10:00	24:30:00	LPRSA0189744	PAP-00456139	
5/5/1952 15:30	5/6/1952 14:00	22:30:00	LPRSA0189745	PAP-00456140	
5/6/1952 20:00	5/7/1952 9:00	13:00:00	LPRSA0189745	PAP-00456140	
5/11/1952 23:30	5/12/1952 13:00	13:30:00	LPRSA0189743	PAP-00456138	
5/20/1952 11:00	5/21/1952 9:30	22:30:00	LPRSA0189741	PAP-00456136	
5/25/1952 11:30	5/26/1952 9:30	22:00:00	LPRSA0189740	PAP-00456135	
6/1/1952 4:00	6/1/1952 7:00	3:00:00	LPRSA0189738	PAP-00456133	
6/1/1952 10:00	6/2/1952 9:30	23:30:00	LPRSA0189738	PAP-00456133	
6/4/1952 21:00	6/5/1952 9:00	12:00:00	LPRSA0189736	PAP-00456131	
6/9/1952 14:30	6/10/1952 8:30	18:00:00	LPRSA0189737	PAP-00456132	
6/10/1952 16:00	6/11/1952 8:30	16:30:00	LPRSA0189737	PAP-00456132	
6/11/1952 16:00	6/12/1952 8:30	16:30:00	LPRSA0189737	PAP-00456132	
6/12/1952 15:00	6/13/1952 9:00	18:00:00	LPRSA0189737	PAP-00456132	
6/17/1952 20:30	6/18/1952 8:30	12:00:00	LPRSA0189735	PAP-00456130	
6/19/1952 12:30	6/20/1952 8:15	19:45:00	LPRSA0189734	PAP-00456129	

8/6/1952 18:30	8/7/1952 9:00	14:30:00	LPRSA0189715	PAP-00456110	
10/2/1952 21:00	10/3/1952 8:00	11:00:00	LPRSA0189707	PAP-00456102	
11/2/1952 8:00	11/2/1952 13:00	5:00:00	LPRSA0189705	PAP-00456100	
11/15/1952 18:00	11/28/1952 9:00	303:00:00	LPRSA0189701	PAP-00456096	
12/5/1952 14:00	12/6/1952 8:00	18:00:00	LPRSA0189702	PAP-00456097	
1/24/1953 14:00	1/25/1953 8:00	18:00:00	LPRSA0189657	PAP-00456558	
2/15/1953 14:00	2/16/1953 9:00	19:00:00	LPRSA0189659	PAP-00456560	
2/21/1953 10:00	2/22/1953 8:00	22:00:00	LPRSA0189660	PAP-00456561	
2/25/1953 13:00	3/10/1953 19:30	318:30:00	LPRSA0189661	PAP-00456562	
3/13/1953 14:30	3/16/1953 8:00	65:30:00	LPRSA0189662	PAP-00456153	
3/17/1953 13:30	3/18/1953 9:30	20:00:00	LPRSA0189662	PAP-00456153	
3/24/1953 12:00	3/25/1953 15:30	27:30:00	LPRSA0189662	PAP-00456153	
4/7/1953 7:15	4/8/1953 9:30	26:15:00	LPRSA0189662	PAP-00456153	
4/10/1953 10:00	4/11/1953 10:30	24:30:00	LPRSA0189662	PAP-00456153	
4/12/1953 9:00	4/13/1953 10:00	25:00:00	LPRSA0189662	PAP-00456153	
4/16/1953 9:00	4/17/1953 10:30	25:30:00	LPRSA0189662	PAP-00456153	
5/22/1953 16:30	5/25/1953 8:30	64:00:00	LPRSA0189662	PAP-00456153	
5/25/1953 14:30	5/27/1953 9:30	43:00:00	LPRSA0189662	PAP-00456153	
6/22/1953 14:30	6/23/1953 8:45	18:15:00	LPRSA0189677	PAP-00456566	
6/30/1953 16:30	6/30/1953 18:30	2:00:00	LPRSA0189679	PAP-00456568	
7/23/1953 10:30	7/24/1953 8:45	22:15:00	LPRSA0189684	PAP-00456573	
8/14/1953 18:30	8/15/1953 11:00	16:30:00	LPRSA0189687	PAP-00456576	
10/28/1953 9:15	10/28/1953 13:30	4:15:00	LPRSA0189692	PAP-00456581	
11/7/1953 11:30	11/8/1953 9:00	21:30:00	LPRSA0189695	PAP-00456584	
11/23/1953 13:00	11/24/1953 9:45	20:45:00	LPRSA0189698	PAP-00456587	
12/14/1953 8:45	12/15/1953 9:00	24:15:00	LPRSA0189647	PAP-00456548	
2/17/1954 10:30	2/17/1954 16:30	6:00:00	LPRSA0189587	PAP-00456488	
3/3/1954 13:45	3/4/1954 9:00	19:15:00	LPRSA0189619	PAP-00456520	
5/21/1954 9:30	5/21/1954 17:00	7:30:00	LPRSA0189631	PAP-00456532	
8/9/1954 12:30	8/10/1954 8:30	20:00:00	LPRSA0189622	PAP-00456523	
8/31/1954 1:30	8/31/1954 15:30	14:00:00	LPRSA0189608	PAP-00456509	
9/11/1954 2:45	9/11/1954 15:30	12:45:00	LPRSA0189606	PAP-00456507	
10/15/1954 14:30	10/15/1954 23:30	9:00:00	LPRSA0189603	PAP-00456504	
10/29/1954 12:45	10/29/1954 16:00	3:15:00	LPRSA0189601	PAP-00456502	
11/2/1954 15:00	11/3/1954 9:30	18:30:00	LPRSA0189600	PAP-00456501	
11/20/1954 4:00	11/25/1954 10:00	126:00:00	LPRSA0189597	PAP-00456498	
12/9/1954 16:30	12/10/1954 10:00	17:30:00	LPRSA0189596	PAP-00456497	
12/14/1954 12:45	12/15/1954 8:30	19:45:00	LPRSA0189595	PAP-00456496	
2/2/1955 10:00	2/4/1955 14:30	52:30:00	LPRSA0189580	PAP-00456483	
2/6/1955 19:05	2/7/1955 10:30	15:25:00	LPRSA0189580	PAP-00456483	
2/11/1955 15:30	2/12/1955 10:00	18:30:00	LPRSA0189580	PAP-00456483	
2/15/1955 17:00	2/16/1955 9:45	16:45:00	LPRSA0189580	PAP-00456483	
2/16/1955 18:00	2/17/1955 9:45	15:45:00	LPRSA0189580	PAP-00456483	
2/23/1955 10:30	2/23/1955 16:45	6:15:00	LPRSA0189579	PAP-00456482	
3/1/1955 13:00	3/1/1955 16:30	3:30:00	LPRSA0189579	PAP-00456482	
3/4/1955 3:00	3/4/1955 13:45	10:45:00	LPRSA0189579	PAP-00456482	
3/6/1955 16:35	3/7/1955 10:30	17:55:00	LPRSA0189579	PAP-00456482	

3/22/1955 10:15	3/23/1955 9:45	23:30:00	LPRSA0189577	PAP-00456480	
8/12/1955 4:45	8/12/1955 13:15	8:30:00	LPRSA0189569	PAP-00456472	
8/12/1955 14:30	8/13/1955 15:15	24:45:00	LPRSA0189569	PAP-00456472	
8/18/1955 23:30	8/19/1955 10:30	11:00:00	LPRSA0189567	PAP-00456470	
10/6/1955 11:30	10/6/1955 17:00	5:30:00	LPRSA0189562	PAP-00456465	
10/14/1955 15:15	10/15/1955 9:00	17:45:00	LPRSA0189561	PAP-00456464	
10/16/1955 16:45	10/17/1955 10:30	17:45:00	LPRSA0189561	PAP-00456464	
10/30/1955 12:00	11/1/1955 15:30	51:30:00	LPRSA0189560	PAP-00456463	
11/11/1955 0:15	11/11/1955 10:00	9:45:00	LPRSA0189559	PAP-00456462	
11/16/1955 11:45	11/17/1955 9:30	21:45:00	LPRSA0189558	PAP-00456461	
2/6/1956 21:30	2/7/1956 9:00	11:30:00	LPRSA0189554	PAP-00456458	
2/18/1956 11:00	2/18/1956 14:20	3:20:00	LPRSA0189553	PAP-00456457	
3/14/1956 11:30	3/14/1956 15:00	3:30:00	LPRSA0189551	PAP-00456455	
9/6/1956 20:45	9/6/1956 23:00	2:15:00	LPRSA0189536	PAP-00456440	
10/31/1956 15:00	11/1/1956 8:30	17:30:00	LPRSA0189532	PAP-00456436	
12/14/1956 13:30	12/15/1956 9:45	20:15:00	LPRSA0189528	PAP-00456432	
2/26/1957 19:00	2/27/1957 8:30	13:30:00	LPRSA0189496	PAP-00456401	
3/15/1957 22:50	3/16/1957 12:00	13:10:00	LPRSA0189522	PAP-00456427	
5/15/1957 23:15	5/16/1957 8:55	9:40:00	LPRSA0189508	PAP-00456413	
5/16/1957 0:00	8/25/1957 23:59				missing data
9/18/1957 0:00	12/19/1957 23:59				missing data
10/1/1958 10:30	10/1/1958 17:15		LPRSA0189470	PAP-00456171	Moved to Union
10/23/1958 5:00	10/23/1958 13:30	8:30:00	LPRSA0189469	PAP-00456170	
7/26/1959 2:30	7/26/1959 10:00	7:30:00	LPRSA0189450	PAP-00456219	
8/13/1959 19:00	8/13/1959 22:45	3:45:00	LPRSA0189446	PAP-00456215	
10/14/1959 20:00	10/15/1959 0:30	4:30:00	LPRSA0189437	PAP-00456206	End time corrected to match throw out log
11/4/1959 19:30	11/4/1959 23:00	3:30:00	LPRSA0189433	PAP-00456202	
5/3/1961 15:00	5/4/1961 0:10	9:10:00	LPRSA0189366	PAP-00456707	
6/1/1961 15:00	6/2/1961 9:15	18:15:00	LPRSA0189363	PAP-00456704	
4/27/1962 17:30	4/28/1962 5:30	12:00:00	LPRSA0189320	PAP-00456312	
11/10/1962 8:00	11/10/1962 9:15	1:15:00	LPRSA0189287	PAP-00456279	
1/1/1963 0:00	9/30/1974 23:59				
Subtotal 1950-1962 Koch Report		2485:55:00			
Subtotal 1950-1962 Throw out Logs		2465:40:00			

Koch report 1974-1975 (PAP-00488480)					
Start Bypass to River	End Bypass to River	Elapsed Time (hr:min:sec)	Source Bates Numbers	AlterEcho Bates Number (throw-out logs)	Comments
9/25/75	9/27/75	0:00:00	LPRSA0203966	PAP-00456760	

ATTACHMENT Q
ALLOCATION SHARE RELATIVE RANKING AND ALLOCATION TIER
DESIGNATIONS

ARR3239

Attachment Q

Protocol Calculation			
Allocation Party	Allocation Share		Tier
Occidental Chemical Corp.	99.9396103%		1
(Remaining Shares)	(0.0603897%)	Relative Relationship	
Nokia-Lucent Technologies		46.5388134%	2
Pharmacia LLC		25.9370220%	2
PMC, Inc.		6.3107885%	3
EnPro Holdings, Inc.		4.0799154%	3
Hexcel Corp.		4.0129312%	3
Pitt Consol Chemical Company		2.1075332%	3
ISP Chemicals LLC		2.0873124%	3
Givaudan Fragrances Corp.		2.0430554%	3
Congoleum Corp.		1.6307658%	3
BASF Corporation		1.2689422%	3
Cooper Industries LLC		0.7431313%	4
PSE&G Corp.		0.7184661%	4
Seton Company, Inc. (Seton Tanning)		0.4551284%	4
Hoffman-La Roche Inc.		0.2722425%	4
Legacy Vulcan Corporation		0.2379896%	4
21st Century Fox America, Inc. (21CFA)		0.2162104%	4
Celanese Ltd./CAN Holdings LLC		0.1470196%	4
Curtiss-Wright Corporation		0.1155887%	4
Teval/Guyon		0.0998371%	4
Okonite Company		0.0886025%	4
Alliance Chemical Inc.		0.0792190%	4
Kearny Smelting & Refining		0.0791604%	4
Sherwin Williams Co.		0.0750817%	4
CBS Corporation		0.0750617%	4
Benjamin Moore & Co.		0.0573881%	4
EPEC Polymers, Inc.		0.0555862%	4
Conopco, Inc.		0.0511509%	4
Royce Associates		0.0466181%	4
SpectraServ, Inc.		0.0407659%	4
General Electric Company		0.0385437%	4
Safety Kleen Envirosystems Co./McKesson Corp.		0.0331328%	4
Chevron Environmental Management Co.		0.0319408%	4
Stanley Black & Decker, Inc.		0.0291504%	4
Schiffenhaus Packaging Corp. (Rock-Tenn Company)		0.0273822%	4
Leemilt's Petroleum, Inc.		0.0267819%	4
Tiffany and Company		0.0246104%	4
Atlantic Richfield (ARCO)		0.0207039%	4
Atlas Refining Inc.		0.0147611%	5
DII Industries, LLC		0.0144528%	5
Campbell Foundry Company		0.0105394%	5
Goody Products Inc.		0.0097449%	5
Garfield Molding Company, Inc.		0.0067139%	5
Otis Elevator Co.		0.0057359%	5
Berol Corporation		0.0040333%	5
Franklin Burlington Plastics Inc.		0.0038179%	5
BASF Catalysts LLC		0.0037037%	5

Alternative Calculation			
Allocation Party	Allocation Share		Tier
Occidental Chemical Corp.	92.9393785%		1
(Remaining Shares)	(7.0606215%)	Relative Relationship	
Nokia-Lucent Technologies		46.4497868%	2
Pharmacia LLC		25.9407032%	2
Cooper Industries LLC		5.2222787%	3
Hexcel Corp.		4.0360037%	3
Pitt Consol Chemical Company		2.5204410%	3
21st Century Fox America, Inc. (21CFA)		2.4921730%	3
PMC, Inc.		2.1505874%	3
ISP Chemicals LLC		2.0900282%	3
Congoleum Corp.		1.6573816%	3
BASF Corporation		1.3118590%	3
EnPro Holdings, Inc.		1.0109293%	3
Seton Company, Inc. (Seton Tanning)		0.5714991%	4
Sherwin Williams Co.		0.5219668%	4
Conopco, Inc.		0.3897339%	4
PSE&G Corp.		0.3264248%	4
Kearny Smelting & Refining		0.3161964%	4
CBS Corporation		0.2964852%	4
Hoffman-La Roche Inc.		0.2934307%	4
EPEC Polymers, Inc.		0.2758512%	4
Givaudan Fragrances Corp.		0.2671831%	4
Legacy Vulcan Corporation		0.2374502%	4
Curtiss-Wright Corporation		0.2197574%	4
SpectraServ, Inc.		0.2084573%	4
Schiffenhaus Packaging Corp. (Rock-Tenn Company)		0.1607304%	4
Okonite Company		0.1602333%	4
Alliance Chemical Inc.		0.1355722%	4
Celanese Ltd./CAN Holdings LLC		0.1101060%	4
Teval/Guyon		0.1086445%	4
Benjamin Moore & Co.		0.0570810%	4
DII Industries, LLC		0.0551970%	4
Safety Kleen Envirosystems Co./McKesson Corp.		0.0403431%	4
Royce Associates		0.0359439%	4
Chevron Environmental Management Co.		0.0318397%	4
Stanley Black & Decker, Inc.		0.0270416%	4
BASF Catalysts LLC		0.0269404%	4
Tiffany and Company		0.0268942%	4
Leemilt's Petroleum, Inc.		0.0266034%	4
Otis Elevator Co.		0.0236263%	4
Atlantic Richfield (ARCO)		0.0199979%	4
Textron Inc.		0.0144746%	5
Arkema Inc.		0.0133237%	5
Atlas Refining Inc.		0.0127793%	5
Newark Morning Ledger Co.		0.0120213%	5
Campbell Foundry Company		0.0115030%	5
Newark Group, Inc.		0.0104945%	5
Garfield Molding Company, Inc.		0.0096987%	5

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Attachment Q

Protocol Calculation			
Allocation Party	Allocation Share		Tier
Arkema Inc.		0.0030895%	5
Goodrich Corporation		0.0023775%	5
Textron Inc.		0.0019441%	5
Newark Morning Ledger Co.		0.0018162%	5
PPG Industries Inc.		0.0017694%	5
Revere Smelting & Refining Corp.		0.0016943%	5
Newark Group, Inc.		0.0016611%	5
Quality Carriers, Inc./Qala Systems		0.0016586%	5
Sun Chemical Corporation (Foundry Street Complex)		0.0012703%	5
Coats & Clark, Inc.		0.0012252%	5
Harris Corporation		0.0010767%	5
Foundry Street Corporation (Foundry Street Complex)		0.0005978%	5
Purdue Pharma Technologies Inc.		0.0004985%	5
Ashland Inc.		0.0004383%	5
Neu Holdings (Eden Wood Corporation)		0.0004116%	5
Roman Asphalt Corporation		0.0003077%	5
Alden Leeds Inc.		0.0002650%	5
Passaic Pioneer Properties Co.		0.0002409%	5
Tate & Lyle Ingredients Americas LLC		0.0002387%	5
STWB Inc.		0.0001015%	5
Honeywell International, Inc.		0.0000803%	5
Essex Chemical Corporation		0.0000746%	5
Canning Gumm LLC		0.0000693%	5
Elan Chemical Co., Inc.		0.0000115%	5
Hartz Consumer Group, Inc.		0.0000037%	5
National Standard LLC		0.0000006%	5
Covanta Essex Company		0.0000003%	5

Alternative Calculation			
Allocation Party	Allocation Share		Tier
Revere Smelting & Refining Corp.		0.0085994%	5
Franklin Burlington Plastics Inc.		0.0079842%	5
Goodrich Corporation		0.0077880%	5
Coats & Clark, Inc.		0.0066207%	5
Harris Corporation		0.0063160%	5
Goody Products Inc.		0.0039965%	5
General Electric Company		0.0039762%	5
Purdue Pharma Technologies Inc.		0.0027557%	5
PPG Industries Inc.		0.0026514%	5
Neu Holdings (Eden Wood Corporation)		0.0024160%	5
Passaic Pioneer Properties Co.		0.0016852%	5
Quality Carriers, Inc./Qala Systems		0.0016454%	5
Tate & Lyle Ingredients Americas LLC		0.0016439%	5
Sun Chemical Corporation (Foundry Street Complex)		0.0012805%	5
Foundry Street Corporation (Foundry Street Complex)		0.0006026%	5
Honeywell International, Inc.		0.0005850%	5
STWB Inc.		0.0005345%	5
Essex Chemical Corporation		0.0005208%	5
Canning Gumm LLC		0.0004707%	5
Berol Corporation		0.0001721%	5
Ashland Inc.		0.0000189%	5
Roman Asphalt Corporation		0.0000131%	5
Alden Leeds Inc.		0.0000113%	5
National Standard LLC		0.0000054%	5
Hartz Consumer Group, Inc.		0.0000051%	5
Covanta Essex Company		0.0000027%	5
Elan Chemical Co., Inc.		0.0000005%	5

ARR3241

ATTACHMENT R

**ADDITIONAL CONTAMINANT INVENTORY ANALYSIS FOR LOWER EIGHT
MILES OF THE LOWER PASSAIC RIVER, APRIL 2019**

ARR3242

Additional Contaminant Inventory Analysis
for
Lower Eight Miles of the Lower Passaic River
April 2019

Objective

The primary goal of this analysis is to determine the inventory of copper, lead, dieldrin, and polycyclic aromatic hydrocarbons (PAHs) in the lower 8.3 miles of the Lower Passaic River (Operable Unit 2 or OU2 of the Diamond Alkali Superfund Site). This analysis is based on the 1990-2012 data sets and statistical methods presented in Data Evaluation Report No.5 (DER No 5) of the 2014 Remedial Investigation and Focused Feasibility Study Reports (RI/FFS) (USEPA, 2014). Although the 2012 dataset is listed in Section 1.2 of the DER No 5, review of the mass inventory calculation presented in DER No 5 indicates that the 2012 data were not included in the calculation.

This analysis also updates the mass of 2,3,7,8-TCDD, Total PCBs, Total 4,4'-DDx and mercury using all data from 1990 - 2012. In addition, the updates reflect changes made for consistency with the 2016 Record of Decision (ROD) Responsiveness Summary (USEPA, 2016), as discussed below (under "Results").

Method

- Sediment chemistry data from 1990 – 2012 were used in the analysis (as listed in Section 1.2 of DER No 5 of the RI/FFS).
- PAHs and dieldrin were analyzed by both high-resolution and low-resolution methods. Comparisons of PAHs and dieldrin concentrations from high-resolution and low-resolution methods suggested that the differences were not statistically significant. Therefore, no adjustments were made to the low-resolution data. However, for sediment samples for which both high-resolution and low-resolution results were available, the high-resolution data were used.
- For PAHs, mass estimates were calculated for three different sums: high molecular weight PAHs (HMW), low molecular weight PAHs (LMW), and total PAHs (TPAH). HMW were the sum of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene. LMW were the sum of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, phenanthrene and 2-methynaphthalene. And TPAH were the sum of the above 17 PAHs. The non-detect (ND) values for individual PAH were set as '0' in calculating the sums, unless all component PAHs in the sum were ND in which case half of the highest individual detection limit was used as the sum.

- For copper, lead, and dieldrin, the ND values were set as half of their reporting detection limit, consistent with how contaminants that are not sums of individual components were treated in DER No. 5.
- Average values were used for samples with field duplicates.
- Mass estimates were made for 1) the total inventory in the lower 8.3 miles of the Lower Passaic River; 2) the inventory in the Tierra Phase I removal area; and 3) the inventory that would be removed if the selected remedy were implemented as described in the 2016 ROD.

Results - Contaminant Inventory Assessment

The results obtained for the four contaminants are presented in Table 1 below. The total mass of contaminants in the fine-grained sediments of the lower 8.3 miles of the Lower Passaic River is as follows:

- Copper and lead have estimated masses of about 2,100,000 and 3,200,000 kilograms (kg), respectively, with associated relative standard errors of about 6.7 percent for copper and 6.3 percent for lead.
- Dieldrin has an estimated mass of about 390 kg, with a relative standard error of about 35 percent.
- LMW PAH and HMW PAH have estimated masses of about 170,000 kg and 240,000 kg, respectively, with associated relative standard errors of about 16 percent for LMW PAHs and 6.7 percent for HMW PAHs. The estimated mass of TPAH is about 410,000 kg, with a relative standard error of about 10 percent.

Table 1 also shows the updated mass of 2,3,7,8-TCDD, Total PCBs, Total DDX and mercury based on the 1990-2012 data sets and statistical methods presented in DER No 5. In addition, the ROD Selected Remedy mass has been updated consistent with the 2016 ROD Responsiveness Summary to reflect: 1) the final extent and depth of the navigation channel included in the ROD Selected Remedy; 2) the integration of the Tierra Removal Phase 2 area with the lower 8.3-mile remedy in a coordinated and consistent manner; and 3) the correction of an error in the PCB mass calculation performed for the Responsiveness Summary.

References

USEPA, 2014. Data Evaluation Report No. 5: Contaminant Inventory Analysis, Lower Eight Miles of the Lower Passaic River. Prepared by Louis Berger for USEPA, 2014. Available at <http://passaic.sharepointspace.com/Public%20Documents/2014-01-30%20DER5%20Contaminant%20Inventory%20Analysis.pdf>

USEPA, 2016. Record of Decision 8.3 Miles of the Lower Passaic River Part of the Diamond Alkali Superfund Site Essex and Hudson Counties, New Jersey. Available at <https://semspub.epa.gov/work/02/396055.pdf>

Table 1: Summary of Mass Estimates for RM 0 to RM 8.3. Values rounded to 2-significant figures.

Contaminant	Total Mass Prior to Phase 1 or ROD Remedy (kg)	Phase 1 Mass (kg)	ROD Selected Remedy Mass (kg)
Copper	2,100,000	12,000	570,000
Lead	3,200,000	16,000	860,000
Dieldrin	390	230	30
LMW PAH	170,000	700	64,000
HMW PAH	240,000	1,300	82,000
TPAH	410,000	2,000	150,000
2,3,7,8-TCDD	38	9.8	6.2
Total 4,4'-DDx	27,000	21,000	570
Mercury	42,000	240	11,000
Total PCB	26,000	230	7,200

ATTACHMENT S
CULPABILITY & COOPERATION FACTORS WORKSHEET

ARR3246

CONSIDERATIONS IN DETERMINING CULPABILITY & COOPERATION FACTORS

The following considerations were taken into account in determining how to assign factors for the culpability and cooperation of Allocation Parties.

In the conduct of a hazardous waste site allocation, consideration of a party's actions that exacerbate the scope of contamination requiring remediation or to cooperate with government in efforts to resolve the risk associated with such contamination are evaluated to provide equitable adjustments to the calculation of the party's share of responsibility. As noted in the foundational Gore Factors these considerations of culpability and cooperation are described as:

The degree of care exercised by the party with respect to the hazardous substance concerned, taking into account the characteristics of such hazardous substance; and

The degree of cooperation by the party with federal, state, or local officials to prevent any harm to the public health or the environment.

In the current matter, a range of actions were evaluated to establish the relative culpability and cooperation of the Allocation Parties.

The following types of considerations were evaluated in determining an appropriate facility Culpability Factor, based on available information. As noted below, given the limitations on conduct of an independent evaluation of facility operations regarding COCs, I am reviewing general facility operations where appropriate to consider the potential for activities leading to the release of the COCs.

- Whether the operations of a facility met industrial standards of environmental conduct for the era in which they occurred
- The persistent or recurring nature of sloppy or substandard industrial practices involving COCs
- Whether sloppy industrial practices or the nature of releases of other hazardous substances indicate a potential for or likelihood of releases of COCs
- Whether facility actions resulted in the issuance of NOV's or other administrative actions noting concern regarding facility operations
- The frequency or number of NOV issuance
- Whether actions resulted in the filing of civil or criminal actions to address facility operations or resulting contamination
- Whether actions were taken with apparent disregard of impact on human health or the environment or demonstrate an intentional violation of federal or state environmental authorities

The following types of considerations were evaluated in determining an appropriate negative or positive facility Cooperation Factor.

- Whether opportunities to cooperate with governmental/regulatory entities to address environmental or public harm were refused, taken under duress through compliance with a UAO, or voluntarily undertaken via an AOC/CD or independently in cooperation with such entities
- The level of participation in the activities and funding of actions by PRP Groups working in cooperation with governmental/regulatory entities to address environmental or public harm
- The extent to which an Allocation Party's efforts in cooperation with governmental/regulatory entities to address environmental or public harm benefited other Allocation Parties by removing more contamination than they are individual responsible for having contributed to OU2
- The level of participation in the offered allocation process, including the voluntary submission of requested documents and information regarding facility operations and contaminating practices

History of Allocation Party Cooperation with Remedial Activities

A number of the Allocation Parties have cooperated with governmental/regulatory entities to address environmental or public harm caused by contamination of OU2 through individual action or participation in the activities of PRP Groups, the Cooperating Parties Group (CPG) and the Small Parties Group (SPG), formed, in part, for that purpose. The CPG was formed in February 2004 and the SPG was subsequently formed. The following is a summary of activities undertaken by Allocation Parties and the amounts of funding, if available, committed in support of EPA's remedial or removal activities in the Lower Passaic River and OU2.

2007 RI/FS ASAOC – In June 2007, members of the CPG entered into an Administrative Settlement Agreement and Order on Consent (“ASAOC”) with EPA for a Remedial Investigation/Feasibility Study (“RI/FS”), in which the settling parties agreed to take over the performance of the 17-mile Lower Passaic River Study Area (“LPRSA”) RI/FS from EPA. The CPG members' costs include costs of all activities required and approved by EPA, reimbursement of EPA's oversight costs, and costs for other activities in support of the RI/FS. Costs, through the end of April 2020, expended by the CPG members for such efforts amount to \$124,882,811 as of that date. Occidental Chemical, an original member of the CPG, left the group in May 2012, and though continuing to pay its portion of EPA oversight costs has not contributed to RI/FS related costs since its departure from the group. Seton Tanning, likewise, left the CPG in May 2014 and ceased financial support for group activities.

Other RI/FS Costs – In 2004, the CPG members signed an ASAOC with EPA to fund EPA's work on the RI/FS for the 17-mile LPR. CPG members paid \$12.64 million to EPA, excluding what was paid by OxyChem and its indemnitors. In addition to this § 122(h) Settlement, CPG members incurred other recoverable response costs in furtherance of EPA's RI/FS during the period from 2004 to 2007, totaling \$3,142,680.

2012 Phase 1 Removal Action – In June 2008, EPA, OCC and Tierra signed an AOC for a non-time-critical removal action to remove 200,000 cy of contaminated sediment from the river (from RM 3.0 to RM 3.8) adjacent to the 80-120 Lister Avenue facility. This action is referred to as the "Tierra Removal." Sediment at depth adjacent to the facility has been found to have the highest levels of 2,3,7,8-TCDD measured in the river. Dredging, dewatering and transport off site of the first 40,000 cy of sediment (known as Phase 1 of the Tierra Removal) was completed in 2012. In 2015, Tierra, on behalf of OCC, collected additional samples in the Phase 2 area. Amount of funding committed to these efforts is unknown. The Phase 1 removal activities removed the following volumes of COCs determined by EPA to be located in the OU2 remedial area.

Contaminant of Concern	Total COC Mass Prior to Phase 1 or ROD Remedy (kg)	COC Mass Removed During Phase 1 (kg)
Copper	2,100,000	12,000
Lead	3,200,000	16,000
Dieldrin	390	230
LMW PAH	170,000	700
HMW PAH	240,000	1,300
TPAH	410,000	2,000
2,3,7,8-TCDD	38	9.8
Total 4,4'-DDx	27,000	21,000
Mercury	42,000	240
Total PCB	26,000	230

Activities by members of the CPG and SPG in support of EPA's actions to address OU2 remediation are ongoing in nature.